United States Department of Agriculture

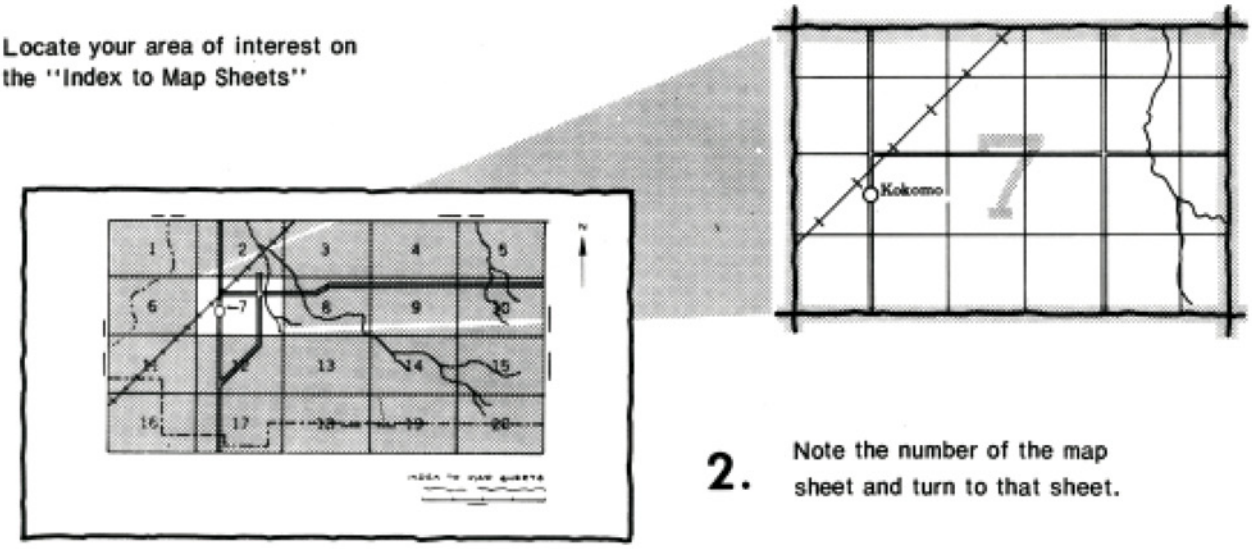
Soil Conservation Service

In cooperation with The Pennsylvania State University College of Agriculture, the Pennsylvania Department of Environmental Resources, State Conservation Commission, and the Union County Board of Commissioners

Soil Survey of Union County, Pennsylvania

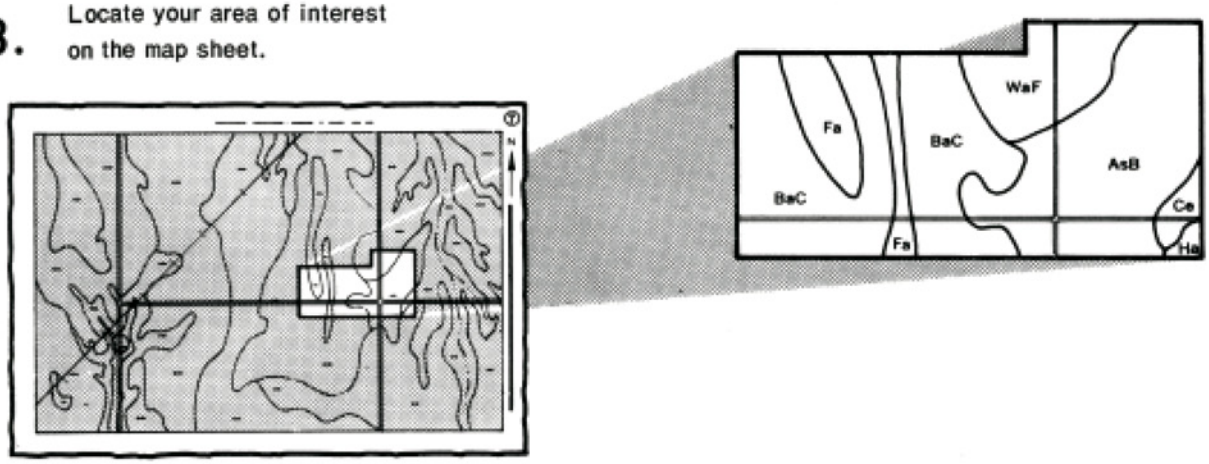
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

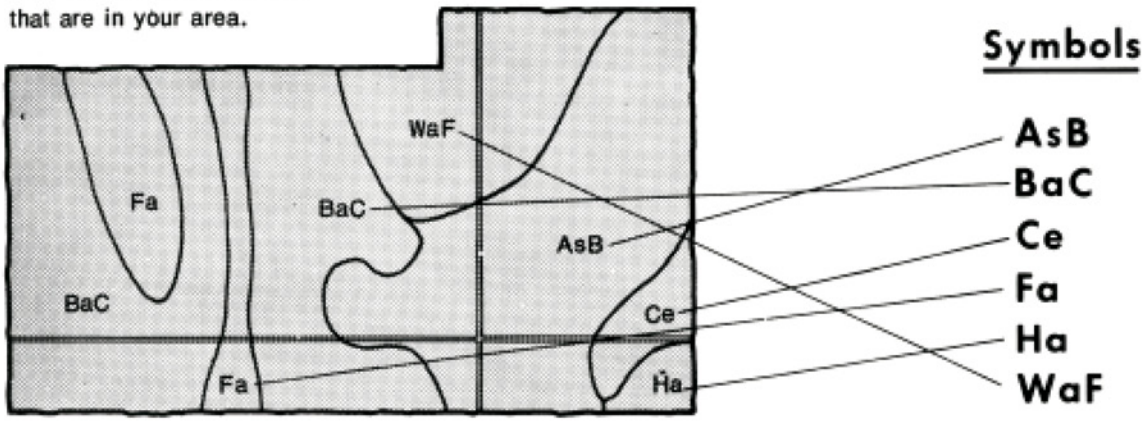


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

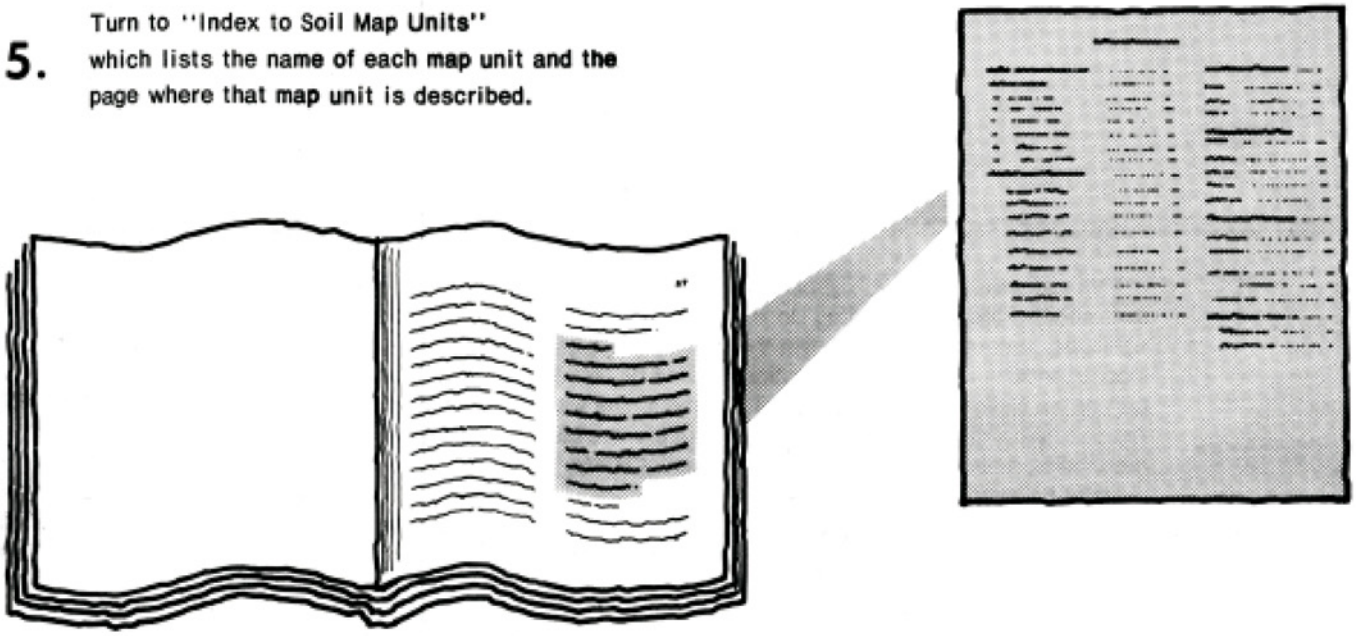


4. List the map unit symbols that are in your area.

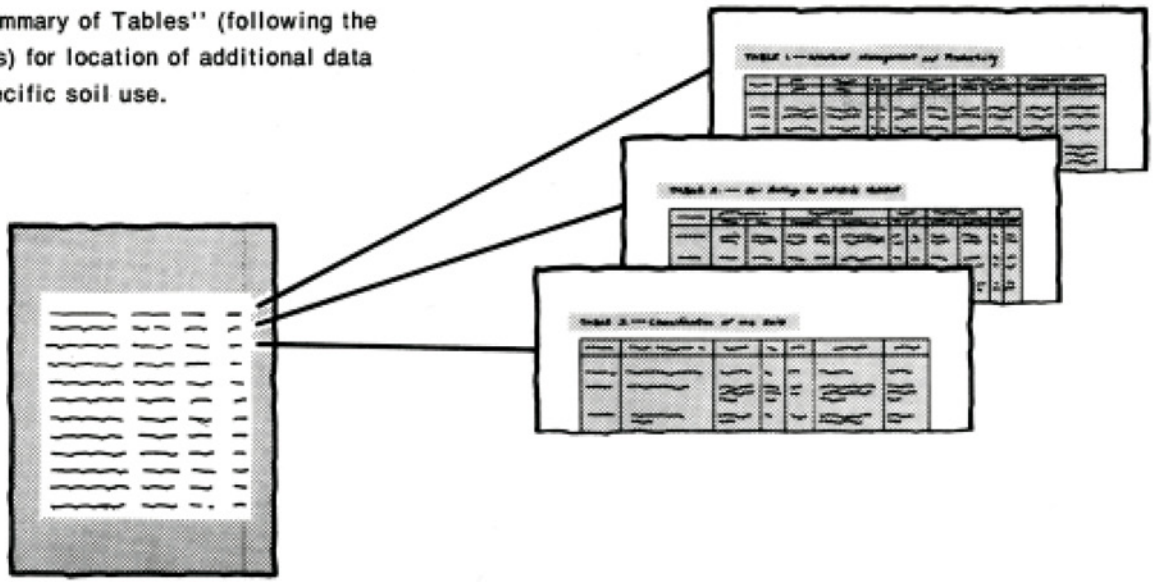


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1977 and was part of a four-county survey that covered Montour, Northumberland, Snyder, and Union Counties. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, The Pennsylvania State University College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission. Financial assistance for the soil survey was provided by the Union County Board of Commissioners. The survey is part of the technical assistance furnished to the Union County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Stripcropping reduces runoff and helps control erosion on Edom complex, 3 to 8 percent slopes.

Contents

Soil Series

Issued March 1985

Index to Map Units

Summary of Tables

Foreword

It is my pleasure to introduce the Soil Survey of Union County. This report contains much information useful in land planning programs. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

The soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber protection. Planners, community officials, engineers, developers, builders, and home buyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use it to help them understand, protect, and enhance the environment.

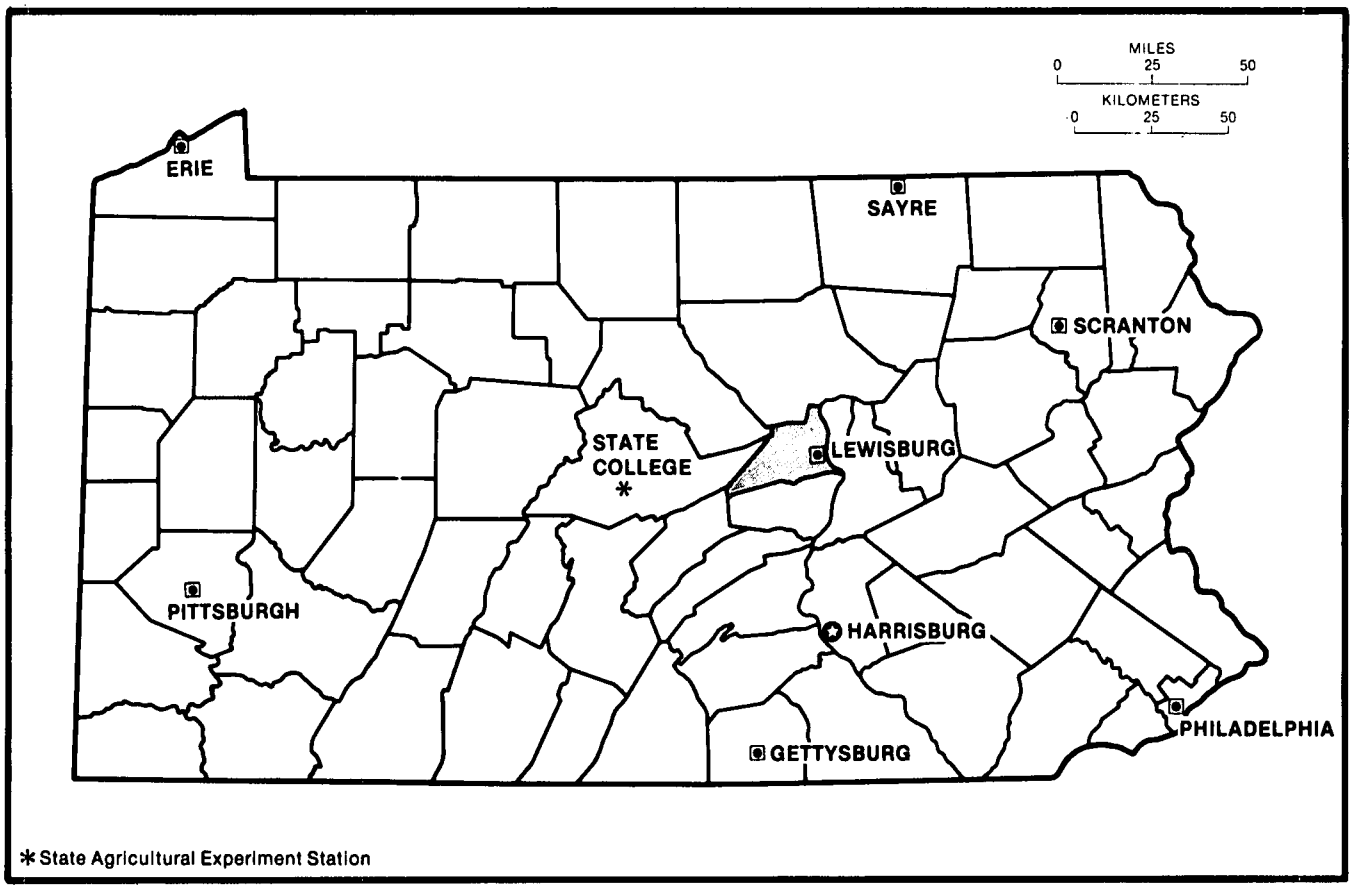
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to onsite sewage disposal. A high water table makes a soil poorly suited to basements and underground utilities.

This report consists of two parts: The first part includes descriptions, potentials, hazards, and limitations of all the soils in Union County; the second part has detailed maps showing the soils of every acre of land in the county.

It is impossible to explain all the ways that this report may be used. Additional information and assistance can be obtained from your local office of the Soil Conservation Service or the Cooperative Extension service.

I believe that the use of the information in this soil survey report will help you have a better environment and a better life. The widespread use of this information will greatly assist all of us in the conservation, development, and productive use of our soil, water, and related resources

Graham T. Munkittrick
State Conservationist
Soil Conservation Service



Location of Union County in Pennsylvania.

Soil Survey of Union County, Pennsylvania

By Joseph J. Eckenrode, Soil Conservation Service

Fieldwork by Joseph J. Eckenrode, Gerald D. Yoder, and John T. Haagen, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
The Pennsylvania State University College of Agriculture;
the Pennsylvania Department of Environmental Resources,
State Conservation Commission;
and the Union County Board of Commissioners

Union County is in the east-central part of Pennsylvania. The county has a total area of approximately 319 square miles, or 204,000 acres, and is in the Valley and Ridge physiographic province. About 53 percent of the county is wooded. The main automotive routes are Interstate 80, U.S. 15, and State routes 192 and 45.

The county is in the Susquehanna River Basin. Spruce Run in the north, Buffalo Creek in the central part, and Penns Creek in the south are the major drainageways, and all three flow east into the West Branch of the Susquehanna River.

The 1970 census lists the population of Union County at 28,603. Lewisburg, the county seat, and Mifflinburg are the main population centers.

Farming is a major industry in the county. About 540 farms are in the county, producing dairy products, beef, hogs, and chickens.

A large percentage—about 60 percent—of the soils in Union County are well drained. Most of the well drained soils are sloping or steep, and many are shallow or moderately deep to bedrock. The other soils are moderately well drained, somewhat poorly drained, poorly drained, or very poorly drained.

This soil survey provides updated and additional information to a soil survey of Union County published in 1946 (*7*), and has maps that show the soils in greater detail.

General Nature of the Survey Area

This section provides information about the climate of Union County and describes the geology and water resources of the county.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Sunbury, Pennsylvania, in the period 1957 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 28 degrees F, and the average daily minimum temperature is 19 degrees. The lowest temperature on record, which occurred at Sunbury on January 22, 1961, is -15 degrees. In summer the average temperature is 70 degrees, and the average daily maximum temperature is 82 degrees. The highest recorded temperature, which occurred at Sunbury on July 4, 1966, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40

degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 39 inches. Of this, 22 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 12 inches. The heaviest 1-day rainfall during the period of record was 7.45 inches at Sunbury on June 22, 1972. Thunderstorms occur on about 35 days each year, and most occur in summer.

The average seasonal snowfall is 35 inches. The greatest snow depth at any one time during the period of record was 24 inches. On an average of 24 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 35 percent in winter. The prevailing wind is from the west. Average windspeed is highest, 10 miles per hour, in spring.

Heavy rains, which can occur at any time of the year, and severe thunderstorms in summer sometimes cause flash flooding, particularly in narrow valleys.

Geology

Bruce Benton, geologist, Soil Conservation Service, helped to prepare this section.

Union County is in the Valley and Ridge physiographic province. Topographically, the county is divided into mountain ridges and low, rolling valleys. The prominent ridges in the county are in the northern, western, and southern parts. They are: Seven Notch, Shrine, Jones, and Paddy Mountains in the western section; Nittany and Naked Mountains in the northern section; and Penns Creek and Shamokin Mountains in the southern portion. The valleys of Buffalo Creek, Penns Creek, Turtle Creek, and White Deer Hole Creek make up the valley and lowland areas in the county. The West Branch of the Susquehanna River is the eastern border of the county. Elevation in the county ranges from 2,100 feet above sea level at Naked Mountain to 420 feet above sea level at the West Branch.

Sedimentary rocks of Ordovician, Silurian, and Devonian ages are in the county. The mountain ridge sections are composed of weather-resistant Ordovician- and Silurian-age sandstones, shales, and conglomerates. Soils of the Laidig-Buchanan-Meckesville and Dekalb-Ungers-Hazleton associations are dominant in these areas. Less resistant Silurian carbonate and shale formations form the valleys. These formations are in the Edom association, the Weikert-Berks-Hartleton association, the Klinesville-Calvin-Meckesville association, and the Hagerstown-Elliber-Washington association.

Regional uplift and compression from the southeast during the Permian Period (200 million years ago) caused intense folding of beds into anticline and syncline features. Subsequent erosion has reduced the original rugged topography to its present form. The orientation of the long ridges and bedrock strike ranges between east-west and northeast-southwest.

During the Pleistocene Period, the Illinoian glacial advance entered the county from the northeast along the North Branch of the Susquehanna River. Outwash terrace and till deposits commonly are along the river valley, in the Holly-Basher-Monongahela association. Some glacial till deposits are in valleys west of Lewisburg. These deposits are in the Allenwood-Alvira-Shelmadine association.

Recent alluvium deposits are in many of the stream and river valleys, covered by the Holly-Basher-Monongahela association.

Water Resources

The county has a mean annual precipitation of 39 inches and a mean annual runoff of 20 inches. Water supply for the county comes primarily from wells and reservoirs. Most of the ground-water supplies come from high-yielding carbonate rocks in the valley and lowland areas. The quantity of water from the upland shale and sandstone areas is lower but reliable. Shallow dug wells and springs were once common sources of water, and some may still exist, but these sources may not be reliable during drought periods. Surface reservoirs supply the municipalities of Lewisburg, Mifflinburg, and West Milton.

The possibility of ground-water contamination exists in areas of soils with rapid permeability in the subsoil, such as Wyoming and Wheeling soils. Ground-water contamination may also occur in areas of soils with fractured bedrock or bedrock with solution channels near the surface, for example, in Weikert, Klinesville, Berks, Calvin, and Opequon soils.

How This Survey was Made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Laidig-Buchanan-Meckesville association

Nearly level to steep, deep, well drained and moderately well drained soils on mountain side slopes and foot

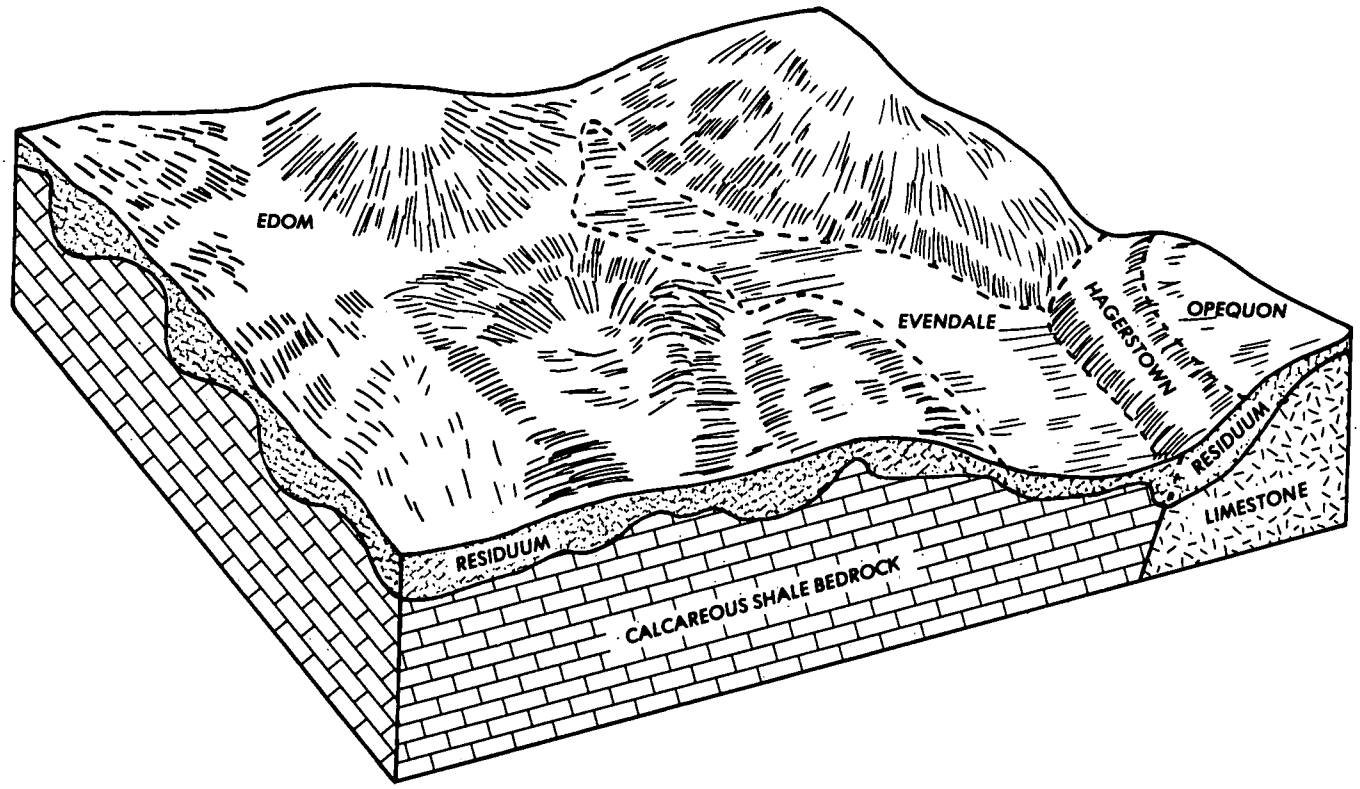


Figure 1.—Typical pattern of soils and underlying material in the Edom association.

slopes; formed in colluvial material weathered from sandstone and some shale

This association makes up about 24 percent of the county. It consists of broad areas on mountainsides.

Well drained Laidig soils make up about 23 percent of the association. They are on the side slopes and upper part of the foot slopes. Moderately well drained Buchanan soils make up about 21 percent of the association. They are on toe slopes. Well drained Meckesville soils make up about 15 percent of the association. They are on side slopes and the upper parts of foot slopes. The remaining 41 percent of the association consists of soils of minor extent, chiefly Shelmadine soils in depressions and on toe slopes, Dystrochrepts and Ungers and Hazleton soils on upper slopes, and Udifluvents and Fluvaquents along drainageways.

Nearly all of this association is in woodland. Stones in and on the soils, slow permeability, and slope are the major limitations of the association.

2. Dekalb-Ungers-Hazleton association

Gently sloping to steep, moderately deep and deep, well drained soils on mountainsides and mountaintops; formed in material weathered from sandstone

This association makes up about 21 percent of the county. It consists of broad areas on mountaintops and mountainsides.

Moderately deep Dekalb soils make up about 37 percent of the association, deep Ungers soils about 25 percent of the association, and deep Hazleton soils about 13 percent of the association. The remaining 25 percent of the association consists of soils of minor extent, chiefly Dystrochrepts and Clymer soils on the side slopes of mountains and mountaintops, Laidig soils on side slopes, and Shelmadine soils in depressions and low areas.

This association is in woodland, much of which is State owned. Stones in and on the soils, slope, and the depth to bedrock are the major limitations of the association.

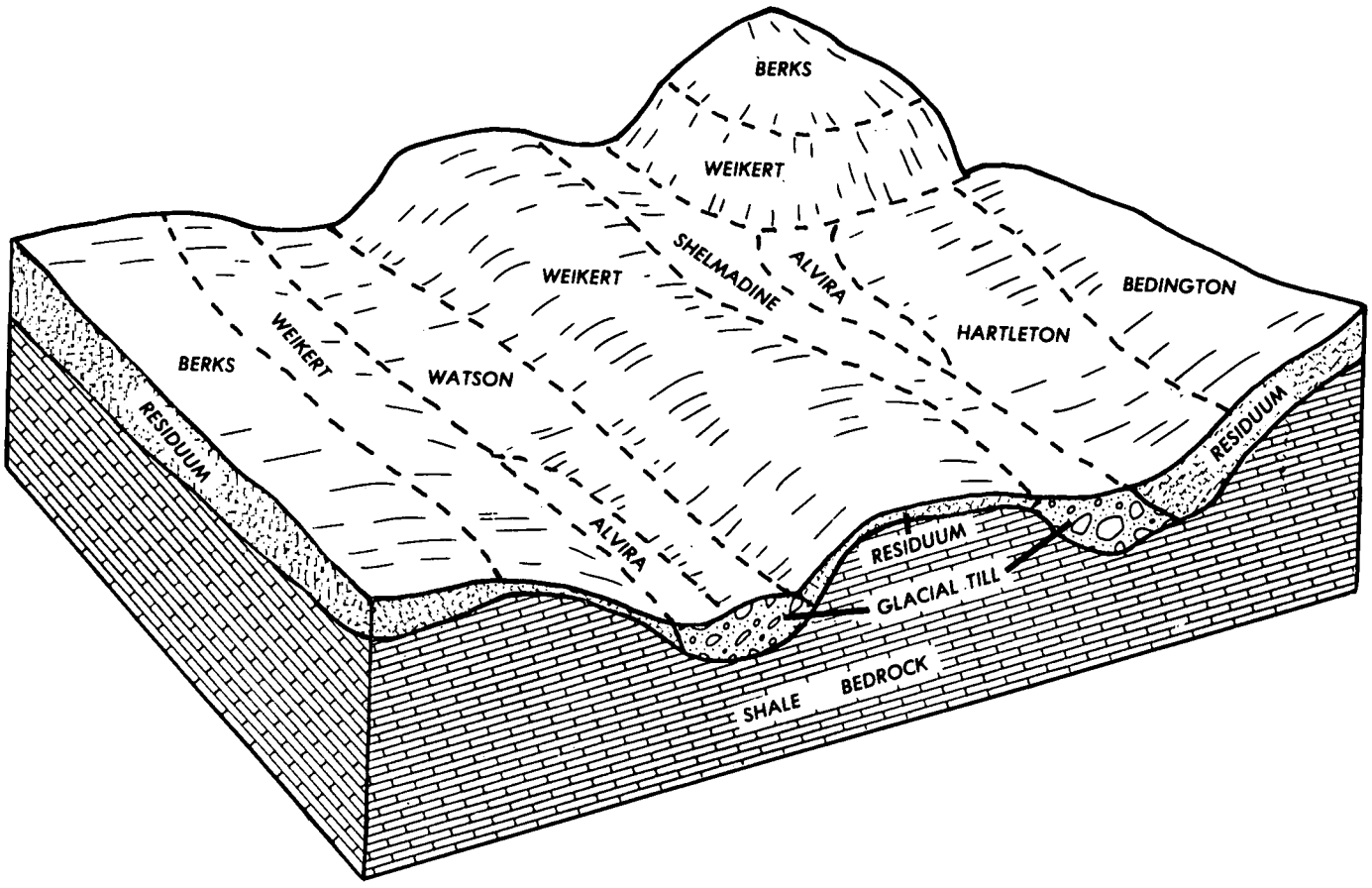


Figure 2.—Typical pattern of soils and underlying material in the Weikert-Berks-Hartleton association.

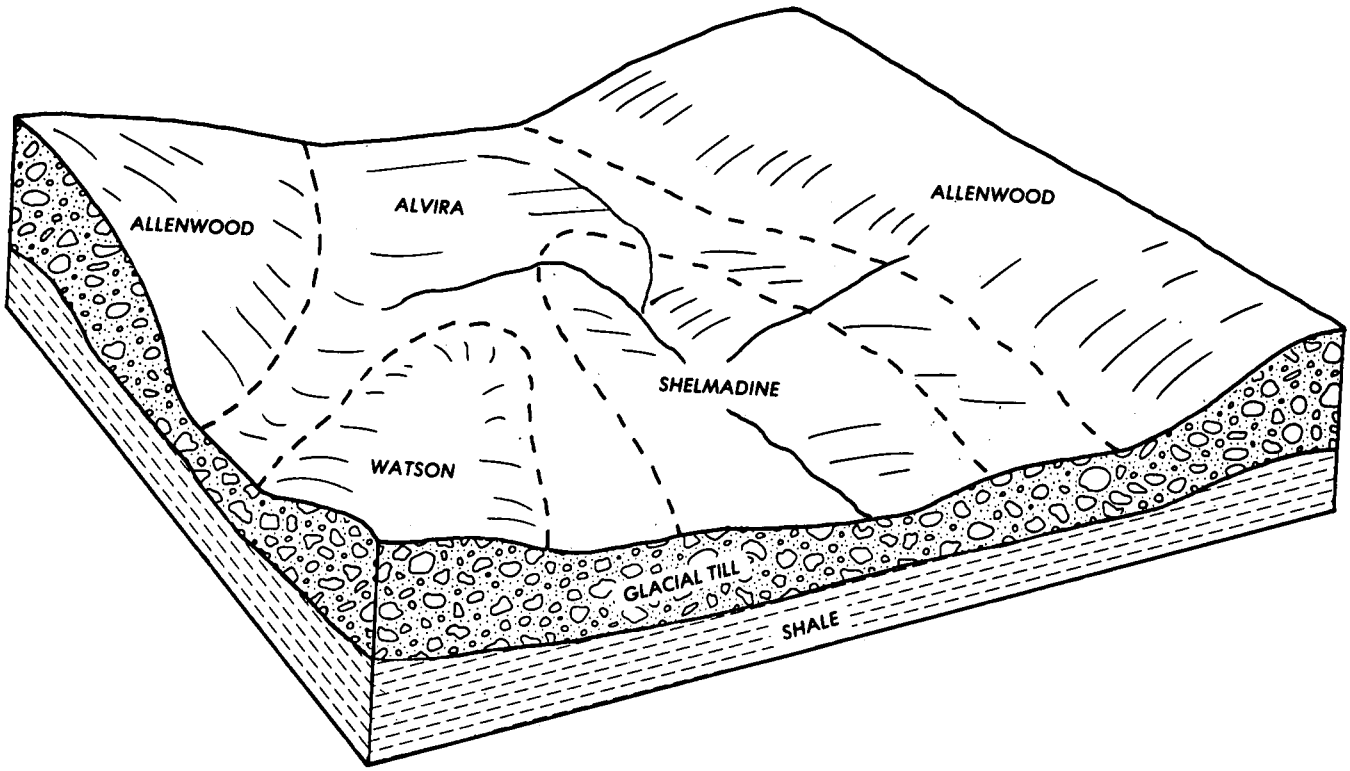


Figure 3.—Typical pattern of soils and underlying material in the Allenwood-Alvira-Shelmadine association.

3. Edom association

Gently sloping to moderately steep, deep and moderately deep, well drained soils on uplands; formed in material weathered from calcareous shale

This association makes up about 14 percent of the county. It consists of soils on ridges (fig. 1).

Edom soils and soils similar to Edom soils make up about 53 percent of the association. The remaining 47 percent of the association consists of soils of minor extent, chiefly Evendale and Washington soils in depressions and low areas, Hagerstown and Opequon soils on uplands, and Holly and Basher soils on flood plains.

Nearly all of this association is suited to and used for crops. Some areas are used for building sites. The depth to bedrock and an erosion hazard are the main limitations of the association.

4. Weikert-Berks-Hartleton association

Gently sloping to steep, shallow to deep, well drained soils on hills and ridges; formed in material weathered from shale and some sandstone

This association makes up about 13 percent of the county. It consists of uplands sharply dissected by drainageways (fig. 2).

Shallow Weikert soils make up about 32 percent of the association. They are on ridgetops and side slopes. Moderately deep Berks soils make up about 25 percent of the association. They are on benches and side slopes of ridges. Deep Hartleton soils make up about 13 percent. They are on benches and broad uplands. The remaining 30 percent of the association consists of minor soils, chiefly Watson, Alvira, and Shelmadine soils in depressions and along small drainageways; Bedington soils on benches; and Holly and Basher soils on flood plains.

This association is mainly suited to and used for crops; some of the steeper areas are wooded, and some areas are used for building sites. The depth to bedrock, slope, an erosion hazard, and very low available water capacity are the main limitations of the association.

5. Allenwood-Alvira-Shelmadine association

Nearly level to moderately steep, deep, and well drained, somewhat poorly drained, and poorly drained soils on uplands; formed in material weathered from glacial till

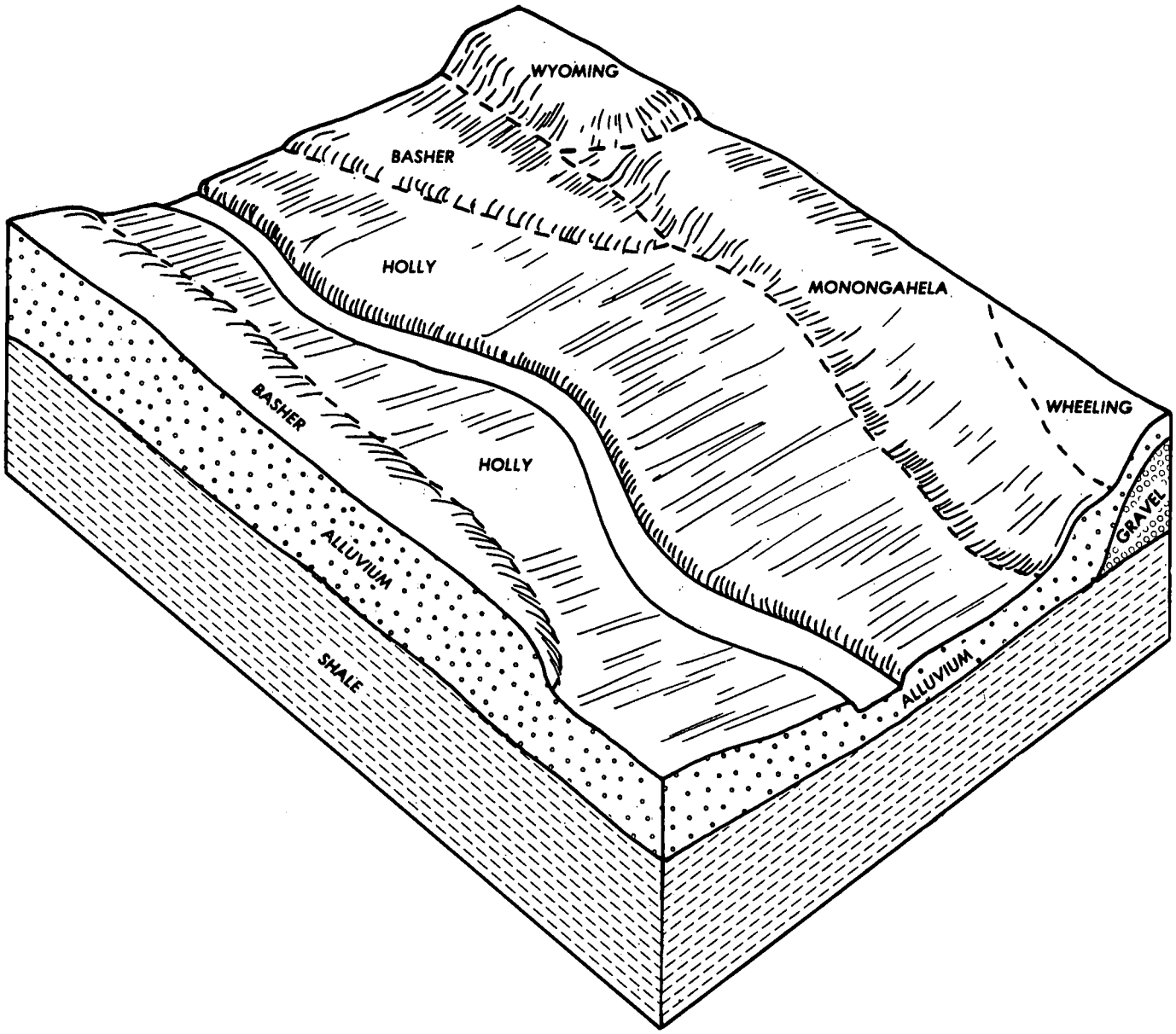


Figure 4.—Typical pattern of soils and underlying material in the Holly-Basher-Monongahela association.

This association makes up about 9 percent of the county. It consists of areas dissected by broad drainageways (fig. 3).

Well drained Allenwood soils make up about 25 percent of the association. They are nearly level to moderately steep soils on convex areas. Somewhat poorly drained Alvira soils make up about 15 percent of this association. They are nearly level to sloping soils in depressions and low areas. Poorly drained Shelmadine soils make up about 15 percent of this association. They are nearly level or gently sloping soils in depressions and low areas. The remaining 45 percent of this association consists of soils of minor extent, chiefly Washington, Meckesville, Hartleton, and Watson soils at higher elevations and Holly and Basher soils on flood plains.

This association is mostly suited to and used for crops. Sizable areas, however, are publicly owned. Slow permeability and a seasonal high water table are the main limitations of the association.

6. Holly-Basher-Monongahela association

Nearly level to gently sloping, deep, very poorly drained to moderately well drained soils on flood plains and terraces; formed in alluvial material

This association makes up about 8 percent of the county and is in narrow areas (fig. 4).

Poorly drained and very poorly drained Holly soils make up about 40 percent of the association. They are nearly level soils on flood plains. Moderately well drained and somewhat poorly drained Basher soils make up about 15 percent of the association. They are nearly level soils on flood plains. Moderately well drained Monongahela soils make up about 10 percent of the association. They are nearly level or gently sloping soils on terraces. The remaining 35 percent of the association consists of soils of minor extent, chiefly Barbour and Linden soils and Udifluvents and Fluvaquents on flood plains and Wyoming and Wheeling soils on terraces.

Most of this association is in crops and pasture, and the association contains nearly all of the commercial vegetables grown in the county. The Basher and Monongahela soils are well suited to crops, but poor drainage limits the suitability of the Holly soils. Flooding, wetness, and an erosion hazard are the main limitations of the association.

7. Klinesville-Calvin-Meckesville association

Gently sloping to steep, shallow to deep, well drained soils on hills and ridges; formed in material weathered from shale and some sandstone

This association makes up about 6 percent of the county and consists of areas dissected by drainageways.

Shallow Klinesville soils make up about 26 percent of the association. They are on ridgetops and side slopes. Moderately deep Calvin soils make up about 20 percent of the association. They are on side slopes of ridges. Deep Meckesville soils make up about 20 percent of the association. They are on foot slopes of ridges. The remaining 34 percent of the association consists of soils of minor extent, chiefly Leck Kill, Berks, and Weikert soils on side slopes of ridges and Albrights and Shelmadine soils in depressions.

This association is mainly used for and suited to crops. Some areas are used for building sites, and some small steep areas are in woodland. The depth to bedrock, an erosion hazard, slow permeability, and slope are the main limitations of the association.

8. Hagerstown-Elliber-Washington association

Gently sloping to steep, deep, well drained and moderately well drained soils in valleys and on ridges; formed in glacial till and in material weathered from limestone

This association makes up about 5 percent of the county. It consists of broad valleys and low ridges.

Well drained Hagerstown soils make up about 35 percent of the association. They are gently sloping to moderately steep soils in valleys and on ridges and are dissected by broad drainageways. Well drained Elliber soils make up about 30 percent of the association. They are gently sloping to steep soils on the tops and side slopes of ridges. Moderately well drained Washington soils make up about 10 percent of the association. They are gently sloping soils in low areas between ridges and in slightly concave areas in valleys. The remaining 25 percent of the association consists of soils of minor extent, chiefly Evendale and Kreamer soils in depressions and along small drainageways and Edom and Opequon soils on ridges.

Most of this association is suited to and used for crops and woodland. Some areas are used for building sites. Slope and an erosion hazard are the main limitations of the association.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the county. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, *Berks shaly silt loam, 3 to 8 percent slopes,* is one of several phases in the Berks series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. *Calvin-Klinesville shaly silt loams, 3 to 8 percent slopes,* is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. *Laidig and Meckesville extremely stony soils, 8 to 25 percent slopes,* is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. *Pits* is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AbB—Albrights silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained and somewhat poorly drained. It is on ridges and in drainageways. The areas are irregular in shape or long and narrow and generally range from 3 to 20 acres.

Typically, the surface layer is dark reddish gray silt loam about 15 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 15 and 30 inches, it is mottled, reddish brown clay loam. At a depth of more than 30 inches, it is a very firm layer of mottled, reddish brown and dark reddish gray silt loam.

Included with this soil in mapping are small areas of Alvira, Meckesville, and Leck Kill soils. Also included are soils similar to this Albrights soil but that are better drained. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Albrights soil is moderately slow, and the available water capacity is moderate. The hazard of erosion is moderate. Runoff is medium. The firm part of the subsoil restricts rooting to a depth of 18

to 32 inches. A seasonal high water table is at a depth of 6 to 36 inches.

Most areas of this soil are farmed. The soil is suited to cultivated crops. The seasonal high water table and moderate erosion hazard are the main limitations for farming. Contour stripcropping, minimum tillage, grassed waterways, diversion terraces, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The seasonal high water table interferes with the seeding and harvesting of some crops, especially in the wetter areas, but the use of surface and subsurface drainage in these areas allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has a moderately high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. The use of equipment is restricted in some areas for short periods by the seasonal high water table, but machine planting generally is practical on large areas.

The moderately slow permeability and seasonal high water table limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed on this soil, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3o.

AnA—Allenwood gravelly silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and well drained. It is on hilltops. The areas are irregular in shape and range generally from 3 to 15 acres.

Typically, the surface layer is dark brown gravelly silt loam about 11 inches thick. The subsoil is strong brown, yellowish red, and red gravelly silty clay loam 57 inches thick. The substratum is red very gravelly silt loam to a depth of 89 inches or more.

Included with this soil in mapping are small areas of Watson, Bedington, and Washington soils. Also included are Allenwood soils that have less gravel in the surface layer than does this Allenwood soil and soils similar to this Allenwood soil but that are moderately well drained. Included areas make up about 25 percent of the unit and areas generally are less than 3 acres each.

The permeability of this Allenwood soil is moderate, and available water capacity is high. The hazard of erosion is slight. Runoff is medium.

Most areas of this soil are cultivated. Some areas are used for pasture.

The soil is well suited to cultivated crops. Incorporating crop residue into the soil and using grasses and legumes and a cover crop in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. Machine planting generally is practical on large areas.

The soil has few limitations for nonfarm use.

The capability class is I; the woodland ordination group is 2o.

AnD—Allenwood gravelly silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on uplands. The areas are long and narrow and range generally from 4 to 30 acres.

Typically, the surface layer is dark brown gravelly silt loam about 11 inches thick. The subsoil is strong brown, yellowish red, and red gravelly silty clay loam 57 inches thick. The substratum is red very gravelly silt loam to a depth of 89 inches or more.

Included with this soil in mapping are small areas of Laidig, Meckesville, Bedington, and Hartleton soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Allenwood soil is moderate, and the available water capacity is high. The hazard of erosion is very severe. Runoff is rapid.

This soil is fairly suited to cultivated crops. The hazard of erosion is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture, and most areas are used for pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope is the main limitation of the soil for nonfarm use, especially for use as a site for septic tanks and for building sites.

The capability subclass is IVe; the woodland ordination group is 2r.

AoB—Allenwood and Washington soils, 3 to 8 percent slopes. This unit consists of gently sloping, deep, well drained soils on hills. The areas are irregular in shape and range generally from 5 to 30 acres. Some areas consist mostly of Allenwood soils, some mostly of Washington soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 50 percent Allenwood soils, 30 percent Washington soils, and 20 percent other soils.

Typically, the Allenwood soils have a surface layer of dark brown gravelly silt loam about 11 inches thick. The subsoil is strong brown, yellowish red, and red gravelly silty clay loam 57 inches thick. The substratum is red very gravelly silt loam to a depth of 89 inches or more.

Typically, the Washington soils have a surface layer of dark brown silt loam about 8 inches thick. The subsoil is 40 inches thick. The upper 17 inches of the subsoil is strong brown gravelly silty clay loam and gravelly clay loam. The lower 23 inches is yellowish brown gravelly clay loam. The substratum is brownish yellow clay loam to a depth of 62 inches or more.

Included with these soils in mapping are small areas of Watson, Meckesville, Bedington, Hartleton, and Washington soils. Also included are small areas of Allenwood soils that have less gravel in the surface layer than does this Allenwood soil or that have a surface layer of cobbly silt loam and soils similar to this Allenwood soil but that are moderately well drained. Included areas make up about 20 percent of the unit and generally are less than 5 acres each.

The permeability of these Allenwood and Washington soils is moderate, and the available water capacity is high. The erosion hazard is moderate. Runoff is medium.

Most areas of these soils are cultivated. Some areas are used for pasture.

These soils are well suited to cultivated crops. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The productivity potential for trees is high on the Allenwood soils and very high on the Washington soils. Removal of undesirable species will increase the moisture available to the more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting is generally practical on large areas.

These soils have few limitations for nonfarm use.

The capability subclass is IIe; the woodland ordination group is 2o for the Allenwood soils and 1o for the Washington soils.

AoC—Allenwood and Washington soils, 8 to 15 percent slopes. This unit consists of sloping, deep, well drained soils on hillsides. The areas are irregular in shape and generally range from 3 to 20 acres. Some areas consist mostly of Allenwood soils, some mostly of Washington soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of the unit is about 50 percent Allenwood soils, 30 percent Washington soils, and 20 percent other soils.

Typically, the Allenwood soils have a surface layer of dark brown gravelly silt loam about 11 inches thick. The subsoil is strong brown, yellowish red, and red gravelly silty clay loam 57 inches thick. The substratum is red very gravelly silt loam to a depth of 89 inches or more.

Typically, the Washington soils have a surface layer of dark brown silt loam about 8 inches thick. The subsoil is 40 inches thick. The upper 17 inches of the subsoil is strong brown gravelly silty clay loam and gravelly clay loam. The lower 23 inches is yellowish brown gravelly clay loam. The substratum is brownish yellow clay loam to a depth of 62 inches or more.

Included with these soils in mapping are small areas of Watson, Meckesville, Bedington, and Hartleton soils. Also included are small areas of Allenwood soils that have less gravel in the surface layer than do the other Allenwood soils in this unit. The included areas are generally less than 5 acres each.

The permeability of these Allenwood and Washington soils is moderate, and available water capacity is high. The hazard of erosion is severe. Runoff is medium.

Most areas of these soils are cultivated. Other areas are used for pasture.

These soils are well suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

The soils are well suited to pasture. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The productivity potential for trees is high on the Allenwood soils and very high on the Washington soils. Removal of undesirable species will increase the moisture available to the more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting is generally practical on large areas.

Slope is the main limitation of this unit for nonfarm use, especially as a site for septic tanks and buildings.

The capability subclass is IIIe; the woodland ordination group is 2o for the Allenwood soils and 1o for the Washington soils.

ArA—Alvira silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and somewhat poorly drained. It is on hills. The areas are irregular in shape and range mainly from 3 to 75 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 9 and 21 inches, it is mottled, brown and grayish brown silt loam. At a depth of more than 21 inches, it is a very firm layer of strong brown gravelly silty clay loam and gravelly silt loam.

Included with this soil in mapping are small areas of Albrights, Watson, and Shelmadine soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Alvira soil is slow, and the available water capacity is low or moderate. The erosion hazard is slight. Runoff is slow. The firm part of the subsoil restricts rooting to a depth of 16 to 28 inches. A seasonal high water table is at a depth of about 6 to 18 inches.

Most areas of this soil are used for pasture or hay. Some areas are used for cultivated crops.

This soil is fairly suited to cultivated crops. The seasonal high water table is the main limitation for crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The seasonal high water table interferes with the seeding and harvesting of some crops, but the use of surface and subsurface drains allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. The use of equipment is restricted in some areas for short periods by the seasonal high water table, but machine planting generally is practical on large areas.

The slow permeability and seasonal high water table limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed on this soil, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIw; the woodland ordination group is 3w.

ArB—Alvira silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and somewhat poorly drained. It is on hills. The areas are irregular in shape and range mainly from 3 to 70 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 9 and 21 inches, it is mottled, brown and grayish brown silt loam. At a depth of more than 21 inches, it is a very firm layer of strong brown gravelly silty clay loam and gravelly silt loam.

Included with this soil in mapping are small areas of Watson, Albrights, and Shelmadine soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Alvira soil is slow, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is medium. The firm part of the subsoil restricts rooting to a depth of 16 to 28 inches. A seasonal high water table is at a depth of about 6 to 18 inches.

Most areas of this soil are used for pasture or hay. Some areas are used for cultivated crops.

This soil is fairly suited to cultivated crops. The moderate erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The seasonal high water table interferes with the seeding and harvesting of some crops, but the use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has a moderately high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. The use of equipment is restricted in some areas for short periods by the seasonal high water table, but machine planting generally is practical on large areas.

The moderately slow permeability and seasonal high water table limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed on this soil, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIw; the woodland ordination group is 3w.

ArC—Alvira silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and somewhat poorly drained. It is on hills. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 9 and 21 inches, it is mottled, brown and grayish brown silt loam. At a depth of more than 21 inches, it is a very firm layer of strong brown gravelly silty clay loam and gravelly silt loam.

Included with this soil in mapping are small areas of Watson and Shelmadine soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Alvira soil is slow, and the available water capacity is low or moderate. The erosion hazard is severe. Runoff is rapid. The firm part of the subsoil restricts rooting to a depth of 16 to 28 inches. A seasonal high water table is at a depth of about 6 to 18 inches.

Most areas of this soil are used for pasture or hay.

This soil is fairly suited to cultivated crops. The severe erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The seasonal high water table interferes with the seeding and harvesting of some crops, but the use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. The use of equipment is restricted by the seasonal high water table, but machine planting is generally practical on large areas.

Slow permeability, slope, and the seasonal high water table limit this soil for nonfarm use, especially as a site for septic tanks. Slope limits the soil as a building site, and the water table limits it as a site for buildings with basements. If buildings with basements are constructed on this soil, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIe; the woodland ordination group is 3w.

Ba—Barbour soils, frequently flooded. This unit consists of nearly level, deep, well drained soils on flood plains. Flooding occurs on an average of more than once in 2 years. Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 3 to 60 acres. They consist of Barbour soils with a surface layer of loam, silt loam, or fine sandy loam. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer is dark reddish brown fine sandy loam about 9 inches thick. The subsoil is yellowish red silt loam 24 inches thick. The substratum extends to a depth of 60 inches or more. It is dark reddish brown loamy sand between depths of 33 and 47 inches, reddish brown sandy loam between depths of 47 and 56 inches, and brown sand at a depth of more than 56 inches.

Included with these soils in mapping are small areas of Barbour soils, rarely flooded Udifluvents, frequently flooded, Basher soils, and Holly soils. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of these Barbour soils is moderately rapid, and the available water capacity is moderate or high. Runoff is slow.

These soils are well suited to cultivated crops, and most areas are cultivated. Soil erosion or deposition and crop damage from flooding are the main hazards. Incorporation crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth and reduce the hazard of flood erosion.

The soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

Flooding is the main limitation of these soils for most nonfarm uses. It especially limits the soils as a site for septic tanks or buildings.

The capability subclass is IIw; the woodland ordination group is 2o.

Bb—Barbour-Linden complex, rarely flooded. This unit consists of nearly level, deep, well drained soils on flood plains. Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 5 to 100 acres. They consist of about 45 percent Barbour soils, 35 percent Linden soils, and 20 percent other soils. The Barbour and Linden soils were mapped together because the areas of each are so small or so intermingled that it was not practical to map them separately.

Typically, the Barbour soils have a surface layer of dark reddish brown fine sandy loam about 9 inches thick. The subsoil is yellowish red silt loam 24 inches thick. The substratum extends to a depth of 60 inches or more. It is dark reddish brown loamy sand between depths of 33 and 47 inches, reddish brown sandy loam between depths of 47 and 56 inches, and brown sand at a depth of more than 56 inches.

Typically, the Linden soils have a surface layer of dark brown silt loam about 10 inches thick. The subsoil is 38 inches thick. The upper 17 inches is dark brown fine sandy loam. The lower 21 inches is reddish brown silt loam. The substratum is brown fine sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Basher, Wheeling, and Wyoming soils. Also included are soils similar to these Barbour and Linden soils but that have a gravelly surface layer. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

Permeability is moderately rapid in these Barbour soils and moderately rapid to rapid in these Linden soils. Available water capacity is moderate or high in the Barbour soils and high in the Linden soils. Runoff is slow.

These soils are well suited to cultivated crops, and most areas are cultivated. Soil erosion or deposition and crop damage from rare flooding are the main hazards. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth and reduce the hazard of flood erosion.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The Barbour soils have high productivity potential for trees, and the Linden soils have very high productivity potential. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

A hazard of rare flooding is the main limitation of these soils for nonfarm use.

The capability class is I; the woodland ordination group is 2o for the Barbour soils and 1o for the Linden soils.

Bc—Basher soils. This unit consists of nearly level, deep, moderately well drained and somewhat poorly drained soils on flood plains. The soils are flooded on an average of less than once every 2 years. Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 5 to 50 acres.

Typically, the surface layer is dark reddish brown silt loam about 5 inches thick. The subsoil is reddish brown silt loam 19 inches thick. The lower 9 inches is mottled. The substratum extends to a depth of 60 inches or more. It is mottled, reddish brown and reddish gray silt loam and loam to a depth of 56 inches and stratified sand and gravel at a depth of more than 56 inches.

Included with these soils in mapping are small areas of Barbour and Linden soils. Also included are a few small areas of Holly soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of these Basher soils is moderate or moderately slow, and the available water capacity is moderate or high. Runoff is slow. Rooting is restricted by a seasonal high water table at a depth of about 12 to 36 inches.

These soils are well suited to cultivated crops, and most areas are cultivated. The seasonal high water table is the main limitation for crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth and reduce the hazard of flood erosion. Surface and subsurface drains allow timely tillage. Flooding in some years is a hazard to crops and interferes with seeding and harvesting.

These soils are well suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Use of equipment is restricted in some years by flooding, but machine planting is generally practical on large areas.

Flooding and the seasonal high water table are the main limitations of the soils for nonfarm use, especially as a site for septic tanks or buildings with basements.

The capability subclass is IIw; the woodland ordination group is 2o.

Bd—Basher soils, frequently flooded. This unit consists of nearly level, deep, moderately well drained and somewhat poorly drained soils on flood plains. The soils are flooded on an average of more than once in 2 years. Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 3 to 20 acres.

Typically, the surface layer is dark reddish brown silt loam about 5 inches thick. The subsoil is reddish brown silt loam 19 inches thick. The lower 9 inches is mottled. The substratum extends to a depth of 60 inches or more. It is mottled, reddish brown and reddish gray silt loam and loam to a depth of 56 inches and stratified sand and gravel at a depth of more than 56 inches.

Included with these soils in mapping are small areas of Udifluvents and frequently flooded Barbour soils. Also included are small areas of Holly soils. Included areas

make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of these Basher soils is moderate or moderately slow, and the available water capacity is moderate or high. Runoff is slow. Rooting is restricted by a seasonal high water table at a depth of about 12 to 36 inches.

Most areas of these soils are cultivated. Some areas are used for pasture.

These soils are fairly suited to cultivated crops. The seasonal high water table is the main limitation for crops. Flooding is a hazard to crops in some years. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth and reduce the hazard of flood erosion. The use of surface and subsurface drainage allows timely tillage, but flooding interferes with the seeding and harvesting of some crops.

These soils are well suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Use of equipment is restricted in some years by flooding, but machine planting is generally practical on large areas.

Flooding and the seasonal high water table are the main limitations of the soils for nonfarm use, especially as a site for septic tanks or buildings with basements.

The capability subclass is IIIw; the woodland ordination group is 2o.

BeB—Bedington silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on ridgetops and side slopes. The areas are irregular in shape and range mainly from 3 to 50 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 37 inches thick and is yellowish brown. In sequence downward, it is 4 inches of silt loam, 10 inches of shaly clay loam, 10 inches of silty clay loam, and 13 inches of shaly silty clay loam. The substratum is yellowish brown very shaly clay loam 7 inches thick. Shale bedrock is at a depth of 54 inches.

Included with this soil in mapping are small areas of Berks, Edom, and Hartleton soils. Also included are small areas of Bedington soils with a surface layer of shaly silt loam. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Bedington soil is moderate, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is medium. Bedrock is at a depth of 4 feet or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The soil has a high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting is generally practical on large areas.

The depth to bedrock is the main limitation of the soil for nonfarm use, especially for excavations and for use of the soil as a site for septic tanks.

The capability subclass is IIe; the woodland ordination group is 2o.

BeC—Bedington silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on ridgetops and side slopes. The areas are irregular in shape and range mainly from 3 to 35 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 37 inches thick and is yellowish brown. In sequence downward, it is 4 inches of silt loam, 10 inches of shaly clay loam, 10 inches of silty clay loam, and 13 inches of shaly silty clay loam. The substratum is yellowish brown very shaly clay loam 7 inches thick. Shale bedrock is at a depth of 54 inches.

Included with this soil in mapping are small areas of Berks, Edom, and Hartleton soils. Also included are small areas of Bedington soils with a surface layer of shaly silt loam. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Bedington soil is moderate, and the available water capacity is moderate or high. The erosion hazard is severe. Runoff is medium to rapid. Bedrock is at a depth of 4 feet or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational

grazing, and nutrients help to maintain desirable plant species.

The soil has a high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope and the depth to bedrock are the main limitations of the soil for nonfarm use. Both limit the soil as a site for septic tanks. The depth to rock limits the soil as a site for buildings with basements, and slope is a limitation for most building sites.

The capability subclass is IIIe; the woodland ordination group is 2o.

BkB—Berks shaly silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and well drained. It is on broad hilltops, ridges, and benches. The areas are irregular in shape and range mainly from 3 to 30 acres.

Typically, the surface layer is dark brown shaly silt loam about 11 inches thick. The subsoil is brownish yellow very shaly silt loam 13 inches thick. The substratum is brownish yellow very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of Edom, Weikert, Calvin, Bedington, and Hartleton soils. Also included are areas of soils similar to this Berks soil but in which the depth to the substratum is less than 18 inches or that has up to 2 feet of glacial till on the surface. Included areas make up about 35 percent of the unit and generally are less than 3 acres each.

The permeability of this Berks soil is moderately rapid, and the available water capacity is very low or low. The erosion hazard is moderate. Runoff is medium. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The soil has moderately high productivity potential for trees. The main limitation is the rate of seedling mortality caused by the low or very low available water capacity. Removal of undesirable species will increase the moisture available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of the soil for nonfarm use, especially as a site for septic tanks or buildings with basements. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IIe; the woodland ordination group is 3f.

BkC—Berks shaly silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and well drained. It is on ridges and hillsides. The areas are irregular in shape and range mainly from 3 to 40 acres.

Typically, the surface layer is dark brown shaly silt loam about 11 inches thick. The subsoil is brownish yellow very shaly silt loam 13 inches thick. The substratum is brownish yellow very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of Edom, Weikert, Calvin, and Hartleton soils. Also included are areas of soils similar to this Berks soil but in which the depth to the substratum is less than 18 inches or where up to 2 feet of glacial till is on the surface. Included areas make up about 30 percent of the unit and generally are less than 3 acres each.

The permeability of this Berks soil is moderately rapid, and the available water capacity is very low. The erosion hazard is severe. Runoff is medium to rapid. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is fairly suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. The main limitation is the rate of seeding mortality caused by the low available water capacity. Removal of undesirable species will increase the moisture available to more desirable trees. Machine planting is generally practical on large areas. Constructing logging roads on the contour helps reduce erosion.

The depth to bedrock is the main limitation of the soil for nonfarm use, especially as a site for septic tanks or buildings with basements. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IIIe; the woodland ordination group is 3f.

BkD—Berks shaly silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately deep, and well drained. It is on hillsides. The areas are irregular in shape and range mainly from 3 to 40 acres.

Typically, the surface layer is dark brown shaly silt loam about 11 inches thick. The subsoil is brownish yellow very shaly silt loam 13 inches thick. The substratum is brownish yellow very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 30 inches.

Included with this soil in mapping are small areas of Hartleton, Calvin, Edom, and Weikert soils. Also included are areas of soils similar to this Berks soil but in which the depth to this substratum is less than 18 inches. Included areas make up about 30 percent of the unit and generally are less than 3 acres each.

The permeability of this Berks soil is moderately rapid, and the available water capacity is very low or low. The erosion hazard is very severe. Runoff is rapid. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

Most areas of this soil are in pasture. Some areas are used for cultivated crops.

The very severe erosion hazard makes this soil poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has a moderately high productivity potential for trees. The main limitation is the rate of seedling mortality caused by the low or very low available water capacity. Removal of undesirable species will increase the moisture available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. The use of equipment is restricted by slope.

Slope and the depth to bedrock are the main limitations of the soil for nonfarm use, especially for building sites and sites for septic tanks. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IVe; the woodland ordination group is 3f.

BuB—Buchanan gravelly loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on foot slopes of mountains and is on ridges. The areas are irregular in shape and mainly range from 3 to 30 acres.

Typically, the surface layer is dark grayish brown gravelly loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 10 and 20 inches, it is yellowish brown gravelly silt loam that is mottled in the lower part. At a depth of more than 20 inches, it is a very firm layer of mottled, strong brown gravelly loam.

Included with this soil in mapping are small areas of Laidig, Alvira, and Shelmadine soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Buchanan soil is slow, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is medium. Rooting is restricted at a depth of 18 to 36 inches by a seasonal high water table and the very firm part of the subsoil.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is well suited to cultivated crops. The moderate erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes in the cropping system help to maintain organic matter content and tilth. The use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet are major pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

The seasonal high water table and slow permeability limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains with proper outlets help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3o.

BxB—Buchanan very stony loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and moderately well drained. It is on foot slopes of mountains and on ridges. The areas are irregular in shape and range mainly from 3 to 50 acres. Large stones cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark gray gravelly loam about 2 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 2 and 20 inches, it is yellowish brown gravelly silt loam that is mottled in the lower part. At a depth of more than 20

inches, it is a very firm layer of mottled, strong brown gravelly loam.

Included with this soil in mapping are small areas of Laidig, Alvira, and Shelmadine soils. Also included are small areas of soils similar to this Buchanan soil but that have mottles in the upper part of the subsoil and areas of Udifluvents and Fluvaquents. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Buchanan soil is slow, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is medium. Rooting is restricted at a depth of 18 to 36 inches by a seasonal high water table and the very firm part of the subsoil.

The stones on the surface make this soil poorly suited to farming. The soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. The stones on the surface make machine planting generally impractical.

The seasonal high water table and slow permeability limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains with proper outlets help to prevent seepage of water into the basements.

The capability subclass is VIs; the woodland ordination group is 3o.

BxD—Buchanan very stony loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, deep, and moderately well drained. It is on foot slopes of mountains. The areas are irregular in shape and range mainly from 3 to 50 acres. Large stones cover 3 to 15 percent of the surface.

Typically, the surface layer is very dark gray gravelly loam about 2 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 2 and 20 inches, it is yellowish brown gravelly silt loam that is mottled in the lower part. At a depth of more than 20 inches, it is a very firm layer of mottled, strong brown gravelly loam.

Included with this soil in mapping are small areas of Laidig soils and soils similar to this Buchanan soil but that have mottles in the upper part of the subsoil. Included areas make up about 20 percent of the unit and generally are less than 5 acres each.

The permeability of this Buchanan soil is slow, and the available water capacity is low or moderate. Runoff is medium to rapid. Rooting is restricted at a depth of about 18 to 36 inches by the seasonal high water table and the very firm part of the subsoil.

The stones on the surface make this soil poorly suited to farming. The soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, and machine planting generally is not practical.

The seasonal high water table and slow permeability limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains with proper outlets help to prevent seepage of water into the basements.

The capability subclass is VIs; the woodland ordination group is 3r.

CaB—Calvin-Klinesville shaly silt loams, 3 to 8 percent slopes. This unit consists of gently sloping, well drained soils on upland knobs and ridges. The areas are irregularly shaped and range mostly from 3 to 20 acres. They consist of about 40 percent moderately deep Calvin soils, 25 percent shallow Klinesville soils, and 35 percent other soils. The soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Calvin soils have a surface layer of dark reddish brown shaly silt loam about 8 inches thick. The subsoil is reddish brown very shaly silt loam 17 inches thick. The substratum is reddish brown very shaly silt loam 7 inches thick. Shale bedrock is at a depth of 32 inches.

Typically, the Klinesville soils have a surface layer of dusky red shaly silt loam about 7 inches thick. The subsoil is weak red very shaly silt loam 4 inches thick. The substratum is weak red very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 17 inches.

Included with these soils in mapping are small areas of Berks, Weikert, and Leck Kill soils. Also included are areas of soils similar to this Calvin soil but that have bedrock at a depth of 10 to 20 inches or with up to 2 feet of glacial till on the surface. Included areas make up about 35 percent of the unit and generally are less than 3 acres each.

The permeability of these Calvin and Klinesville soils is moderately rapid. The available water capacity is low or moderate in the Calvin soils and very low in the Klinesville soils. The erosion hazard is moderate. Runoff is medium. Rooting is restricted by bedrock at a depth of 10 to 20 inches in Klinesville soils and at a depth of 20 to 40 inches in the Calvin soils.

Most areas of these soils are cultivated. Some areas are used for pasture.

These soils are fairly suited to cultivated crops. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover

crops in the cropping system help to maintain organic matter content and tilth.

These soils are fairly suited to pasture. The prevention of overgrazing is the main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The Klinesville soils have moderate productivity potential for trees, and the Calvin soils have moderately high productivity potential. Removal of undesirable species will increase the water available to more desirable trees. Machine planting is generally practical on large areas.

The depth to bedrock is the main limitation of these soils for nonfarm use, especially for use of the soils as a site for septic tanks or buildings with basements. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IIe; the woodland ordination group is 3f for the Calvin soils and 4d for the Klinesville soils.

CaC—Calvin-Klinesville shaly silt loams, 8 to 15 percent slopes. This unit consists of sloping, well drained soils on side slopes of upland knobs and ridges. The areas generally are irregular in shape and range mostly from 4 to 40 acres. They consist of about 40 percent moderately deep Calvin soils, 25 percent shallow Klinesville soils, and 35 percent other soils. The soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Calvin soils have a surface layer of dark reddish brown shaly silt loam about 8 inches thick. The subsoil is reddish brown very shaly silt loam 17 inches thick. The substratum is reddish brown very shaly silt loam 7 inches thick. Shale bedrock is at a depth of 32 inches.

Typically, the Klinesville soils have a surface layer of dusky red shaly silt loam about 7 inches thick. The subsoil is weak red very shaly silt loam 4 inches thick. The substratum is weak red very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 17 inches.

Included with these soils in mapping are small areas of Berks, Weikert, and Leck Kill soils. Also included are areas of soils similar to this Calvin soil but that have bedrock at a depth of 10 to 20 inches or have up to 2 feet of glacial till on the surface. Included areas make up about 35 percent of the unit and generally are less than 3 acres each.

The permeability of these Calvin and Klinesville soils is moderately rapid. The available water capacity is low or moderate in the Calvin soils and very low in the Klinesville soils. The erosion hazard is severe. Runoff is medium to rapid. Rooting is restricted by bedrock at a depth of 10 to 20 inches in Klinesville soils and at a depth of 20 to 40 inches in the Calvin soils.

Most areas of these soils are cultivated. Some areas are used for pasture.

These soils are fairly suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are fairly suited to pasture. The prevention of overgrazing is the main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The Klinesville soils have moderate productivity potential for trees, and the Calvin soils have moderately high productivity potential. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of these soils for nonfarm use, especially for use of the soils as a site for septic tanks or buildings with basements. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IIIe; the woodland ordination group is 3f for the Calvin soils and 4d for the Klinesville soils.

CaD—Calvin-Klinesville shaly silt loams, 15 to 25 percent slopes. This unit consists of moderately steep, well drained soils on side slopes of upland knobs and ridges. The areas are irregular in shape and range mostly from 4 to 30 acres. They consist of about 40 percent moderately deep Calvin soils, 25 percent shallow Klinesville soils, and 35 percent other soils. The soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Calvin soils have a surface layer of dark reddish brown shaly silt loam about 8 inches thick. The subsoil is reddish brown very shaly silt loam 17 inches thick. The substratum is reddish brown very shaly silt loam 7 inches thick. Shale bedrock is at a depth of 32 inches.

Typically, the Klinesville soils have a surface layer of dusky red shaly silt loam about 7 inches thick. The subsoil is weak red very shaly silt loam 4 inches thick. The substratum is weak red very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 17 inches.

Included with these soils in mapping are small areas of Berks, Weikert, and Leck Kill soils. Also included are areas of soils similar to these Calvin soils but in which the combined thickness of the surface layer and subsoil

is less than 18 inches. The included areas generally are less than 3 acres each.

The permeability of these Calvin and Klinesville soils is moderately rapid. The available water capacity is low or moderate in Calvin soils and very low in the Klinesville soils. The erosion hazard is very severe. Runoff is rapid. Rooting is restricted by bedrock at a depth of 10 to 20 inches in Klinesville soils and at a depth of 20 to 40 inches in the Calvin soils.

Most areas of these soils are in pasture. Some areas are used for woodland.

The very severe erosion hazard makes these soils poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are fairly suited to pasture. The prevention of overgrazing is the main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

The Klinesville soils have moderate productivity potential for trees, and the Calvin soils have moderately high productivity potential. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope and the depth to bedrock are the main limitations of these soils for nonfarm use, especially as a site for buildings and septic tanks. If buildings with basements are constructed, special equipment is needed to excavate the bedrock.

The capability subclass is IVe; the woodland ordination group is 3f for the Calvin soils and 4d for the Klinesville soils.

DeB—Dekalb extremely stony sandy loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, moderately deep, and well drained. It is on mountaintops. The areas are irregular in shape and range mainly from 10 to 200 acres. Large stones cover about 15 to 50 percent of the surface area.

Typically, the surface layer is very dark grayish brown channery sandy loam about 2 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 13 inches is channery sandy loam. The lower 7 inches is very channery sandy loam. The substratum is yellowish brown very channery sandy loam 11 inches thick. Sandstone bedrock is at a depth of 33 inches.

Included with this soil in mapping are small areas of Hazleton, Clymer, and Leetonia soils. Also included are small areas of soils similar to this Dekalb soil but that are more red. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Dekalb soil is rapid, and the available water capacity is very low to moderate. Runoff is medium. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

The stones on the surface make this soil poorly suited to farming, and removal of the stones for farming generally is impractical.

This soil has moderate productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. The stones on the surface limit the use of equipment, and machine planting generally is not practical.

The depth to bedrock is the main limitation of the soil for nonfarm uses. It especially limits the soil as a site for septic tanks or buildings with basements.

The capability subclass is VIIs; the woodland ordination group is 4x.

DeD—Dekalb extremely stony sandy loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, moderately deep, and well drained. It is on mountainsides and mountaintops. The areas are irregular in shape and range mainly from 10 to 300 acres. Large stones cover about 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown channery sandy loam about 2 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 13 inches is channery sandy loam, and the lower 7 inches is very channery sandy loam. The substratum is yellowish brown very channery sandy loam 11 inches thick. Sandstone bedrock is at a depth of 33 inches.

Included with this soil in mapping are small areas of Hazleton, Clymer, and Ungers soils and Dystrochrepts. Also included are small areas of soils similar to this Dekalb soil but that have more red. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Dekalb soil is rapid, and the available water capacity is very low to moderate. Runoff is medium to rapid. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

The stones on the surface make this soil poorly suited to farming. The soil has moderate productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. The stones on the surface restrict the use of equipment, and machine planting generally is not practical.

Slope and the depth to bedrock are the main limitations of the soil for nonfarm use, especially for use of the soil as a building site or as a site for septic tanks.

The capability subclass is VIIs; the woodland ordination group is 4x.

DeF—Dekalb extremely stony sandy loam, steep. This soil is moderately deep and well drained. It is on mountainsides. Slopes range from 25 to 80 percent. The areas are irregular in shape and range mainly from 15 to 800 acres. Large stones cover about 15 to 50 percent of the surface.

Typically, the surface layer is very dark grayish brown channery sandy loam about 2 inches thick. The subsoil is yellowish brown and is 20 inches thick. The upper 13 inches is channery sandy loam, and the lower 7 inches is very channery sandy loam. The substratum is yellowish brown very channery sandy loam 11 inches thick. Sandstone bedrock is at a depth of 33 inches.

Included with this soil in mapping are areas of Hazleton, Clymer, and Ungers soils; Dystrochrepts; and Rubble land. Included areas make up about 40 percent of the unit and generally are less than 15 acres each.

The permeability of this Dekalb soil is rapid, and the available water capacity is very low to moderate. Runoff is rapid. Rooting is restricted by bedrock at a depth of 20 to 40 inches.

Slope and the stones on the surface make this soil poorly suited to farming. The soil has moderate productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope and the stones on the surface restrict the use of equipment, and machine planting generally is not practical.

Slope and the depth to bedrock are the main limitations of the soil for nonfarm use, especially for use of the soil as a building site or as a site for septic tanks.

The capability subclass is VIIs; the woodland ordination group is 4x.

Dy—Dystrochrepts, bouldery. These soils are nearly level to very steep, shallow to deep, and well drained and somewhat excessively drained. They are on mountaintops and mountainsides. The areas are irregular in shape and range mainly from 5 to 400 acres. Boulders and stones cover 50 to 90 percent of the surface area. Slopes range from 0 to 120 percent.

Typically, the surface layer is 1 to 4 inches thick and is silt loam or loam. The subsoil ranges from 10 to 50 inches in thickness and is silt loam, sandy loam, or loam. The substratum is silt loam, sandy loam, or loam. Most layers have gravel and cobblestones.

Included with these soils in mapping are areas of Rubble land and Hazleton, Ungers, Laidig, Dekalb, Clymer, and Meckesville soils. Included areas make up about 35 percent of this unit and generally are less than 5 acres each.

Dystrochrepts have moderate to rapid permeability and moderate to very low available water capacity. Bedrock is mainly between depths of 20 to 60 inches.

Most areas of this unit are wooded, and the productivity potential for trees is low to moderately low. The stones and boulders on the surface, the slope, and the depth to bedrock limit the unit for most uses and make onsite investigation necessary to determine the suitability of the unit for any use.

This unit is not assigned to a capability subclass or woodland ordination group.

EdB—Edom complex, 3 to 8 percent slopes. This unit consists of gently sloping, well drained soils on undulating ridges. The areas are irregular in shape and range mainly from 3 to 150 acres. They consist of about 40 percent deep Edom soils, 30 percent soils that are similar to Edom soils but that are moderately deep, and 30 percent other soils. These soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Edom soils have a surface layer of dark brown shaly silt loam about 9 inches thick. The subsoil is 30 inches thick. The upper 24 inches is brownish yellow and yellowish brown shaly silty clay loam. The lower 6 inches is yellowish brown shaly clay loam. The substratum is yellowish brown very shaly silty clay loam 36 inches thick. Calcareous shale bedrock is mainly at a depth of 75 inches. Shale bedrock is at a depth of 30 to 40 inches in the moderately deep soils in this unit.

Included with these soils in mapping are small areas of Bedington, Hagerstown, and Washington soils. Also included are areas in which the subsoil extends to a depth of more than 40 inches, areas in which bedrock is at a depth of less than 30 inches, and areas in which the subsoil is more than 35 percent shale fragments. The included areas generally are less than 3 acres each.

The permeability of these Edom soils is moderately slow or moderate, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is medium. Bedrock is at a depth of 40 inches or more in the Edom soils and 30 to 40 inches in the soils similar to the Edom soils.

These soils are fairly suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water

available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock and the permeability of these soils are the main limitations for nonfarm use, especially for use of the soils as a site for septic tanks. The depth to rock limits the soils as a site for buildings with basements.

The capability subclass is IIe; the woodland ordination group is 2o.

EdC—Edom complex, 8 to 15 percent slopes. This unit consists of sloping, well drained soils on ridges. The areas are irregular in shape and range mainly from 3 to 150 acres. They are about 40 percent Edom soils, and 30 percent soils that are similar to Edom soils but that are moderately deep, and 30 percent other soils. These soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Edom soils have a surface layer of dark brown shaly silt loam about 9 inches thick. The subsoil is 30 inches thick. The upper 24 inches is brownish yellow and yellowish brown shaly silty clay loam. The lower 6 inches is yellowish brown shaly clay loam. The substratum is yellowish brown very shaly silty clay loam 36 inches thick. Calcareous shale bedrock is mainly at a depth of 75 inches. Shale bedrock is at a depth of 30 to 40 inches in the moderately deep soils in this unit.

Included with these soils in mapping are small areas of Hagerstown and Washington soils. Also included are areas in which the subsoil extends to a depth of more than 40 inches, areas in which bedrock is at a depth of less than 30 inches, and areas in which the subsoil is more than 35 percent shale fragments. The included areas generally are less than 3 acres each.

The permeability of these Edom soils is moderately slow or moderate, and the available water capacity is moderate or high. The erosion hazard is severe. Runoff is medium to rapid. Bedrock is at a depth of 40 inches or more in the Edom soils and 30 to 40 inches in the soils similar to the Edom soils.

These soils are fairly suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water

available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock and the permeability of these soils are the main limitations for nonfarm use, especially for use of the soils as a site for septic tanks. The depth to rock limits the soils as a site for buildings with basements.

The capability subclass is IIIe; the woodland ordination group is 2o.

EdD—Edom complex, 15 to 25 percent slopes. This unit consists of moderately steep, well drained soils on ridges. The areas are irregular in shape and range mainly from 3 to 150 acres. They are about 40 percent Edom soils, 30 percent soils that are similar to Edom soils but that are moderately deep, and 30 percent other soils. These soils were mapped together because the areas of each soil are so small and so intermingled that it was not practical to map them separately.

Typically, the Edom soils have a surface layer of dark brown shaly silt loam about 9 inches thick. The subsoil is 30 inches thick. The upper 24 inches is brownish yellow and yellowish brown shaly silty clay loam. The lower 6 inches is yellowish brown shaly clay loam. The substratum is yellowish brown very shaly silty clay loam 36 inches thick. Calcareous shale bedrock is mainly at a depth of 75 inches. Shale bedrock is at a depth of 30 to 40 inches in the moderately deep soils in this unit.

Included with these soils in mapping are small areas of Bedington, Hagerstown, and Opequon soils. Also included are areas in which the subsoil extends to a depth of more than 40 inches, areas in which bedrock is at a depth of less than 30 inches, and areas in which the subsoil is more than 35 percent shale fragments. The included areas generally are less than 3 acres each.

The permeability of these Edom soils is moderately slow or moderate, and the available water capacity is moderate or high. The erosion hazard is very severe. Runoff is rapid. Bedrock is at a depth of 40 inches or more in the Edom soils and 30 to 40 inches in the soils similar to the Edom soils.

These soils are fairly suited to cultivated crops, and most areas are cultivated. The very severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion (fig. 5). Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water

Figure 5.—Stripcropping on Edom complex, 15 to 25 percent slopes.

available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope restricts the use of equipment, but machine planting generally is practical on large areas.

Slope, the depth to rock, and the permeability limit these soils for nonfarm use, especially for use as a site for septic tanks and buildings.

The capability subclass is IVe; the woodland ordination group is 2r.

EsB—Elliber cherty silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on ridgetops. The areas are irregular in shape and range mainly from 3 to 50 acres.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown cherty silt loam. The next 20 inches is strong brown cherty loam. The lower 22 inches is yellowish brown cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Hagerstown, Kreamer, and Washington soils. Also included are small areas of Elliber very cherty silt loam and soils similar to this Elliber soil but that contain fewer stone fragments. Included areas make up about 20 percent of the unit and generally are less than 4 acres each.

The permeability of this Elliber soil is moderate, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is slow.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

This soil has few limitations for nonfarm use, but seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is IIe; the woodland ordination group is 2o.

EsC—Elliber cherty silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on side slopes of ridges. The areas are irregular in shape and mainly range from 4 to 40 acres.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown cherty silt loam. The next 20 inches is strong brown cherty loam. The lower 22 inches is yellowish brown cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Hagerstown, Kreamer, and Washington soils. Also included are small areas of Elliber very cherty silt loam and soils similar to these Elliber soils but that have fewer stone fragments. Included areas make up about 20 percent of the unit and generally are less than 4 acres each.

The permeability of this Elliber soil is moderate, and the available water capacity is low or moderate. The erosion hazard is severe. Runoff is slow to medium.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope is the main limitation of this soil for nonfarm use, especially for use as a site for septic tanks or buildings.

The capability subclass is IIIe; the woodland ordination group is 2o.

EsD—Elliber cherty silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on side slopes of ridges. The areas are irregular in shape and range mainly from 4 to 20 acres.

Typically, the surface layer is grayish brown cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown cherty silt loam. The next 20 inches is strong brown cherty loam. The lower 22 inches is yellowish brown cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Hagerstown soils. Also included are small areas of Elliber very cherty silt loam and soils similar to this Elliber soil but that have fewer stone fragments. Included areas make up about 20 percent of the unit and generally are less than 4 acres each.

The permeability of this Elliber soil is moderate, and the available water capacity is low or moderate. The erosion hazard is very severe. Runoff is medium.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is fairly suited to cultivated crops. The very severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope is the main limitation of this soil for nonfarm use, especially for use as a site for septic tanks or buildings.

The capability subclass is IVe; the woodland ordination group is 2r.

EtB—Elliber very cherty silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on ridgetops. The areas are irregular in shape and range mainly from 3 to 30 acres.

Typically, the surface layer is grayish brown very cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown very cherty silt loam. The next 20 inches is strong brown very cherty loam. The lower 22 inches is yellowish brown very cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Kreamer and Opequon soils. Also included are small areas of Elliber cherty silt loam. Included areas make up about 15 percent of the unit and generally are less than 3 acres each.

The permeability of this Elliber soil is moderate or moderately rapid, and the available water capacity is very low to moderate. The erosion hazard is slight. Runoff is slow.

Most areas of this soil are cultivated. Some areas are used for orchards.

This soil is fairly suited to cultivated crops. Stone fragments in and on the soil interfere with tillage and planting. Incorporating crop residue into the soil and using grasses and legumes in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The rate of seedling mortality is the main management concern. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

This soil has few limitations for nonfarm use, but seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is IIIs; the woodland ordination group is 2f.

EtC—Elliber very cherty silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on side slopes of ridges. The areas are irregular in shape and mainly range from 3 to 30 acres.

Typically, the surface layer is grayish brown very cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown very cherty silt loam. The next 20 inches is strong brown very cherty loam. The lower 22 inches is yellowish brown very cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Kreamer and Opequon soils. Also included are small areas of Elliber cherty silt loam. Included areas make up about 15 percent of the unit and generally are less than 3 acres each.

The permeability of this Elliber soil is moderate or moderately rapid, and the available water capacity is very low to moderate. The erosion hazard is moderate. Runoff is slow.

Most areas of this soil are cultivated. Some areas are used for orchards.

Rock fragments in this soil make it poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The rate of seedling mortality is a management concern. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope is the main limitation of this soil for nonfarm use, and seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is IVs; the woodland ordination group is 2f.

EtD—Elliber very cherty silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on side slopes of ridges. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is grayish brown very cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown very cherty silt loam. The next 20 inches is strong brown very cherty loam. The lower 22 inches is yellowish brown very cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Opequon soils. Also included are small areas of Elliber cherty silt loam. Included areas make up about 15 percent of the unit and generally are less than 4 acres each.

The permeability of this Elliber soil is moderate or moderately rapid, and the available water capacity is very low to moderate. The erosion hazard is severe. Runoff is medium.

Most areas of this soil are in pasture. Some areas are used for orchards.

Slope and rock fragments in the soil make this soil generally unsuitable for cultivated crops. The soil is fairly suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The rate of seedling mortality is a management concern. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope is the main limitation of this soil for nonfarm use, and seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is VIs; the woodland ordination group is 2f.

EtF—Elliber very cherty silt loam, 25 to 70 percent slopes. This soil is steep, deep, and well drained. It is on ridges. The areas are long and narrow and mainly range from 4 to 10 acres.

Typically, the surface layer is grayish brown very cherty silt loam about 6 inches thick. The subsoil is 51 inches thick. The upper 9 inches is light yellowish brown very cherty silt loam. The next 20 inches is strong brown very cherty loam. The lower 22 inches is yellowish brown very cherty silt loam. The substratum is brown very cherty silt loam to a depth of 74 inches.

Included with this soil in mapping are small areas of Opequon soils. Also included are areas of Elliber soils with numerous large stones on the surface. Included areas make up about 20 percent of the unit and generally are less than 4 acres each.

The permeability of this Elliber soil is moderate or moderately rapid, and the available water capacity is very low to moderate. The erosion hazard is very severe. Runoff is medium.

Most areas of this soil are wooded. Some areas are used for pasture.

Slope and rock fragments in the soil make this soil generally unsuitable for cultivated crops and poorly suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable pasture plant species.

This soil has high productivity potential for trees. The rate of seedling mortality is a management concern. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope restricts the use of equipment, and machine planting generally is not practical.

Slope is the main limitation of this soil for nonfarm use, and seepage is a hazard for some types of waste-disposal facilities.

The capability subclass is VIIs; the woodland ordination group is 2f.

EvB—Evendale cherty silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and somewhat poorly drained. It is on toe slopes of cherty limestone ridges. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown cherty silt loam about 8 inches thick. The subsoil is 56 inches thick. The upper 43 inches is mottled and is yellowish brown, brown, and strong brown. It is silty clay loam, cherty silty clay loam, cherty silty clay, and cherty clay. The lower 13 inches is dark reddish brown shaly clay loam. Shale bedrock is at a depth of 64 inches.

Included with this soil in mapping are areas of Kreamer and Shelmadine soils, nearly level Evendale soils, and Evendale soils that have fewer rock fragments in the surface layer than this Evendale soil does. Also included are small areas of soils similar to this Evendale soil but that are poorly drained. Included areas make up about 30 percent of the unit and generally are less than 3 acres each.

The permeability of this Evendale soil is slow, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is slow. Bedrock is at a depth of more than 4 feet. Rooting is restricted by a seasonal high water table at a depth of about 6 to 18 inches.

Most areas of this soil are in pasture. Some areas are used for woodland, and some small areas are cultivated.

This soil is fairly suited to cultivated crops. The seasonal high water table and moderate erosion hazard are the main limitations for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The seasonal high water table interferes with the seeding and harvesting of some crops, but the use of surface and subsurface drains allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is the main pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The seasonal high water table restricts equipment use, but machine planting generally is practical on large areas.

The seasonal high water table and slow permeability limit this soil for many nonfarm uses, especially as a site for septic tanks. The seasonal high water table also limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains with proper outlets help to prevent seepage of water into the basements.

The capability subclass is IIIw; the woodland ordination group is 2w.

HaB—Hagerstown silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on valley floors and ridges. The areas are irregular in shape and range mainly from 4 to 300 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches

or more. It is yellowish brown, strong brown, and yellowish red silty clay loam.

Included with this soil in mapping are small areas of Opequon, Washington, and Elliber soils. Also included are areas of soils similar to this Hagerstown soil but that have bedrock at a depth of 30 to 40 inches and Hagerstown soils with a surface layer of cherty silt loam. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Hagerstown soil is moderate, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is medium. Bedrock is at a depth of 40 inches or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has very high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The main limitations of this soil for nonfarm use are the clayey texture of the subsoil and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches. Both limit the soil as a site for septic tanks, and the depth to rock is a limitation for buildings with basements.

The capability subclass is IIe; the woodland ordination group is 1c.

HaC—Hagerstown silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on valley floors and ridges. The areas are irregular in shape and range mainly from 4 to 250 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown, strong brown, and yellowish red silty clay loam.

Included with this soil in mapping are small areas of Opequon, Washington, and Elliber soils. Also included are areas of soils similar to this Hagerstown soil but that have bedrock at a depth of 30 to 40 inches and Hagerstown soils with a surface layer of cherty silt loam. Included areas make up about 15 percent of the unit and generally are less than 3 acres each.

The permeability of this Hagerstown soil is moderate, and the available water capacity is moderate or high The erosion hazard is severe. Runoff is medium to rapid. Bedrock is at a depth of 40 inches or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has very high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

The main limitations of this soil for nonfarm use are the clayey texture of the subsoil and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches. Both limit the soil as a site for septic tanks, and the depth to rock is a limitation for buildings with basements.

The capability subclass is IIIe; the woodland ordination group is 1c.

HaD—Hagerstown silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on valley floors and ridges. The areas are irregular in shape and range mainly from 4 to 50 acres.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. It is yellowish brown, strong brown, and yellowish red silty clay loam.

Included with this soil in mapping are small areas of Edom, Opequon, and Elliber soils. Also included are soils similar to this Hagerstown soil but that have bedrock at a depth of 30 to 40 inches. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Hagerstown soil is moderate, and the available water capacity is moderate or high. The erosion hazard is very severe. Runoff is rapid. Bedrock is at a depth of 40 inches or more.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The very severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use

of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has very high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope, the clayey texture of the subsoil, and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches are the main limitations of this soil for nonfarm use. All are limitations for use of the soil as a site for septic tanks. Slope limits the soil as a building site, and the depth to bedrock is a limitation for buildings with basements.

The capability subclass is IVe; the woodland ordination group is 1c.

HtB—Hartleton channery silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on upland ridges. The areas are irregular in shape and range mainly from 3 to 130 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is brown and is 37 inches thick. The upper 19 inches is channery silt loam and channery silty clay loam. The lower 18 inches is very channery clay loam. The substratum is brown very channery loam 11 inches thick. Sandstone bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Berks, Weikert, Bedington, Leck Kill, and Allenwood soils. Also included are small areas of soils similar to this Hartleton soil but that are more red or in which the combined thickness of the surface layer and subsoil is more than 45 inches. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Hartleton soil is moderate or moderately rapid, and available water capacity is low or moderate. The erosion hazard is moderate. Runoff is medium. Bedrock is at a depth of 40 inches or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

Stones in the soil and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches are the main limitations of the soil for nonfarm use. Both limit the soil as a site for septic tanks, and the depth to rock limits the soil as a site for buildings with basements.

The capability subclass is IIe; the woodland ordination group is 3o.

HtC—Hartleton channery silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on upland ridges. The areas are irregular in shape and range mainly from 3 to 90 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is brown and is 37 inches thick. The upper 19 inches is channery silt loam and channery silty clay loam. The lower 18 inches is very channery clay loam. The substratum is brown very channery loam 11 inches thick. Sandstone bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Berks, Weikert, Bedington, Leck Kill, and Allenwood soils. Also included are small areas of soils similar to this Hartleton soil but that are more red or in which the combined thickness of the surface layer and subsoil is more than 45 inches. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Hartleton soil is moderate or moderately rapid, and available water capacity is low or moderate. The erosion hazard is severe. Runoff is medium to rapid. Bedrock is at a depth of 40 inches or more.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope, stones in the soil, and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches are the main limitations of the soil for nonfarm use. All three limit the soil as a site for septic tanks. The depth to

bedrock is a limitation for buildings with basements, and slope is a limitation for building sites.

The capability subclass is IIIe; the woodland ordination group is 3o.

HtD—Hartleton channery silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on upland ridges. The areas are irregular in shape and mainly range from 3 to 50 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil is brown and is 37 inches thick. The upper 19 inches is channery silt loam and channery silty clay loam. The lower 18 inches is very channery clay loam. The substratum is brown very channery loam 11 inches thick. Sandstone bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Berks, Weikert, Bedington, Leck Kill, and Allenwood soils. Also included are small areas of soils similar to this Hartleton soil but that are more red or in which the combined thickness of the surface layer and subsoil is more than 45 inches. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Hartleton soil is moderate or moderately rapid, and the available water capacity is low or moderate. The erosion hazard is very severe. Runoff is rapid. Bedrock is at a depth of 3-1/2 feet or more.

This soil is fairly suited to cultivated crops. The very severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the moisture available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope, stones in the soil, and the depth to bedrock in areas where bedrock is at a depth of 40 to 72 inches are the main limitations of the soil for nonfarm use. All three limit the soil as a site for septic tanks. The depth to bedrock is a limitation for buildings with basements, and slope is a limitation for building sites.

The capability subclass is IVe; the woodland ordination group is 3r.

HuB—Hazleton and Clymer extremely stony sandy loams, 0 to 8 percent slopes. This unit consists of nearly level and gently sloping, deep, well drained soils on mountaintops and ridgetops. The areas are irregular in shape and range mainly from 5 to 200 acres. Large stones cover 15 to 50 percent of the surface. Some areas are comprised mainly of Hazleton soils, some mainly of Clymer soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 45 percent Hazleton soils, 30 percent Clymer soils, and 25 percent other soils.

Typically, the Hazleton soils have a surface layer of very dark gray very gravelly sandy loam about 4 inches thick. The subsurface layer is grayish brown gravelly sandy loam 4 inches thick. The subsoil is 35 inches thick. The upper 9 inches is yellowish brown gravelly loam. The lower 26 inches is yellowish brown and strong brown very gravelly sandy loam. The substratum is brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Clymer soils have a surface layer of very dark brown gravelly sandy loam about 1 inch thick. The subsurface layer is yellowish brown gravelly sandy loam 2 inches thick. The subsoil is brownish yellow gravelly sandy loam and gravelly loam 27 inches thick. The substratum is reddish yellow gravelly sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Dekalb, Ungers, Leetonia, Laidig, and Buchanan soils. Also included are small areas of Dystrochrepts. Included areas generally are less than 5 acres each.

Permeability is moderately rapid or rapid in these Hazleton soils and moderate or moderately rapid in these Clymer soils. Available water capacity is low or moderate in the Hazleton soils and moderate in the Clymer soils. Runoff is slow to medium. Bedrock is at a depth of 40 inches or more in both soils.

The stones on the surface make these soils generally unsuitable for farming. The Hazleton soils have moderately high productivity potential for trees, and the Clymer soils have high productivity potential. Most areas of the unit are wooded. Removal of undesirable species will increase the moisture available to more desirable trees. The stones on the surface limit the use of equipment, and machine planting generally is not practical.

The stones on the surface are the main limitation of these soils for nonfarm use, especially for use as a site for septic tanks or buildings.

The capability subclass is VIIs; the woodland ordination group is 3x for the Hazleton soils and 2x for the Clymer soils.

HuD—Hazleton and Clymer extremely stony sandy loams, 8 to 25 percent slopes. This unit consists of sloping and moderately steep, deep, well drained soils

on sideslopes, mountaintops, and ridgetops. The areas are irregular in shape and range mainly from 5 to 200 acres. Large stones cover 15 to 50 percent of the surface. Some areas are comprised mainly of Hazleton soils, some mainly of Clymer soils, and some mainly of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 45 percent Hazleton soils, 30 percent Clymer soils, and 25 percent other soils.

Typically, the Hazleton soils have a surface layer of very dark gray very gravelly sandy loam about 4 inches thick. The subsurface layer is grayish brown gravelly sandy loam 4 inches thick. The subsoil is 35 inches thick. The upper 9 inches is yellowish brown gravelly loam. The lower 26 inches is yellowish brown and strong brown very gravelly sandy loam. The substratum is brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Clymer soils have a surface layer of very dark brown gravelly sandy loam about 1 inch thick. The subsurface layer is yellowish brown gravelly sandy loam 2 inches thick. The subsoil is brownish yellow gravelly sandy loam and gravelly loam 27 inches thick. The substratum is reddish yellow gravelly sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Dekalb, Ungers, Laidig, Meckesville, and Buchanan soils. Also included are small areas of Dystrochrepts. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

Permeability is moderately rapid or rapid in these Hazleton soils and moderate or moderately rapid in these Clymer soils. Available water capacity is low or moderate in the Hazleton soils and moderate in the Clymer soils. Runoff is medium to rapid. Bedrock is at a depth of 40 inches or more in both soils.

Slope and the stones on the surface make these soils generally unsuitable for farming. The Hazleton soils have moderately high productivity potential for trees, and the Clymer soils have high productivity potential. Most areas of the unit are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope and the stones on the surface limit the use of equipment, and machine planting generally is not practical.

Slope and the stones on the surface are the main limitations of these soils for nonfarm use, especially for use as a site for septic tanks or buildings.

The capability subclass is VIIs; the woodland ordination group is 3x for the Hazleton soils and 2x for the Clymer soils.

HuF—Hazleton and Clymer extremely stony sandy loams, 25 to 80 percent slopes. This unit consists, of steep, deep, well drained soils on side slopes of mountains and ridges. Large stones cover 15 to 50 percent of the surface area. The areas of the unit are irregular in shape and range mainly from 5 to 200 acres. Some consist mostly of Hazleton soils, some mostly of Clymer soils, and some of both. The total acreage of the unit is about 45 percent Hazleton soils, 30 percent Clymer soils, and 25 percent other soils. The Hazleton and Clymer soils were mapped together because they have no major differences in use and management.

Typically, the Hazleton soils have a surface layer of very dark gray very gravelly sandy loam about 4 inches thick. The subsurface layer is grayish brown gravelly sandy loam 4 inches thick. The subsoil is 35 inches thick. The upper 9 inches is yellowish brown gravelly loam. The lower 26 inches is yellowish brown and strong brown gravelly sandy loam. The substratum is brown gravelly loamy sand to a depth of 60 inches or more.

Typically, the Clymer soils have a surface layer of very dark brown gravelly sandy loam about 1 inch thick. The subsurface layer is yellowish brown gravelly sandy loam 2 inches thick. The subsoil is brownish yellow gravelly sandy loam and gravelly loam 27 inches thick. The substratum is reddish yellow gravelly sandy loam to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Dekalb, Ungers, Laidig, and Meckesville soils. Also included are small areas of Dystrochrepts. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

Permeability is moderately rapid or rapid in these Hazleton soils and moderate or moderately rapid in these Clymer soils. Available water capacity is low or moderate in the Hazleton soils and moderate in the Clymer soils. Runoff is rapid. Bedrock is at a depth of 40 inches or more.

Slope and the stones on the surface make these soils generally unsuitable for farming. Most areas eroded; the Hazleton soils have moderately high productivity potential for trees, and the Clymer soils have high productivity potential. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope and the stones on the surface limit the use of equipment, and machine planting generally is not practical.

Slope and the stones on the surface are the main limitations of the soil for nonfarm use.

The capability subclass is VIIs; the woodland ordination group is 3r for the Hazleton soils and 2r for the Clymer soils.

Hv—Holly silt loam. This soil is nearly level, deep, and poorly drained and very poorly drained. It is on flood plains (fig. 6). Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 3 to 200 acres. They are frequently flooded.

Figure 6.—An area of Holly silt loam.

Typically, the surface layer is dark grayish brown silt loam about 11 inches thick. The subsoil is mottled, gray silt loam and light gray silty clay loam 31 inches thick. The substratum is gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Basher soils and Holly soils that are ponded or rarely flooded. Also included are small areas of Fluvaquents. Included areas make up about 15 percent of the unit and generally are less than 2 acres each.

The permeability of this Holly soil is moderately slow or moderate, and the available water capacity is high. Runoff is slow. Rooting is restricted by a high water table between the surface and a depth of 6 inches in winter and spring.

Most areas of this soil are in pasture or woodland. Some areas are used for cultivated crops.

The seasonal high water table and frequent flooding make this soil poorly suited to cultivated crops. Surface and subsurface drains help to improve drainage and allow timely tillage. The high water table interferes with the seeding and harvesting of some crops.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The major management concern is the rate of seedling mortality. The high water table restricts the use of equipment, but machine planting generally is practical on large areas.

The high water table and frequent flooding limit the soil for nonfarm use, especially for use as a site for septic tanks or buildings.

The capability subclass is IVw; the woodland ordination group is 2w.

Hy—Holly silt loam, ponded. This soil is nearly level, deep, and poorly drained and very poorly drained. It is on flood plains. Water is ponded on the surface throughout the year. Slopes range from 0 to 3 percent. The areas are long and narrow and range mainly from 3 to 40 acres.

Typically, the surface layer is dark grayish brown silt loam about 11 inches thick. The subsoil is mottled, gray silt loam and light gray silty clay loam 31 inches thick. The substratum is gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of frequently flooded Holly soils and rarely flooded Holly soils. Also included are small areas of soils similar to this Holly soil but that have 1 to 2 feet of organic material on the surface. Included areas make up about 15 percent of the unit and generally are less than 2 acres each.

The permeability of this Holly soil is moderately slow or moderate, and the available water capacity is high. Rooting is restricted by the high water table, which is at or near the surface most of the year.

The high water table and water on the surface make this soil generally unsuitable for farming and are the main limitations for most types of nonfarm use. The soil has moderate productivity potential for water-tolerant trees, and most areas are wooded. The water table and water on the surface, however, cause a high rate of seedling mortality, restrict rooting, and limit the use of equipment. Machine planting is not practical on this soil.

The capability subclass is Vw; the woodland ordination group is 4w.

Hz—Holly silt loam, rarely flooded. This soil is nearly level, deep, and poorly drained and very poorly drained. It is on flood plains. Slopes range from 0 to 3 percent. The areas are long and narrow and mainly range from 3 to 90 acres.

Typically, the surface layer is dark grayish brown silt loam about 11 inches thick. The subsoil is mottled, gray silt loam and light gray silty clay loam 31 inches thick. The substratum is gray gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Basher soils, Holly soils that have water on the surface, and frequently flooded Holly soils. Also included are small areas of Monongahela and Alvira soils. Included areas make up about 20 percent of the unit and generally are less than 2 acres each.

The permeability of this Holly soil is moderately slow or moderate, and the available water capacity is high. Runoff is slow. Rooting is restricted by a high water table between the surface and a depth of 6 inches in winter and spring.

Most areas of this soil are in pasture or woodland. Some areas are used for cultivated crops.

This soil is fairly suited to cultivated crops. The seasonal high water table is the main limitation for crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The use of surface and subsurface drainage allows timely tillage. The high water table interferes with the seeding and harvesting of some crops.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. The major management concern is the rate of seedling mortality because of wetness. The high water table limits the use of equipment, but machine planting generally is practical on large areas.

The high water table and a hazard of flooding are the main limitations of the soil for nonfarm use.

The capability subclass is IIIw; the woodland ordination group is 2w.

KmB—Kreamer cherty silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on hillsides. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is dark brown cherty silt loam about 12 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 12 and 23 inches, it is yellowish brown silty clay loam. Between 23 and 33 inches, it is mottled, yellowish brown and strong brown cherty silty clay loam and silty clay loam. At a depth of more than 33 inches, it is mottled, yellowish red cherty silty clay.

Included with this soil in mapping are small areas of Elliber and Evendale soils. Also included are small areas of soils similar to this Kreamer soil but that are well drained. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Kreamer soil is slow, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is slow. Rooting is restricted by a seasonal high water table at a depth of about 18 to 36 inches.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. Use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a main

pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the moisture available to more desirable trees. The seasonal high water table restricts the use of equipment, but machine planting generally is practical on large areas.

The seasonal high water table is the main limitation of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3w.

LaB—Laidig gravelly loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on mountain foot slopes. The areas are irregular in shape and range mainly from 5 to 50 acres.

Typically, the surface layer is yellowish brown gravelly loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches of the subsoil is brownish yellow gravelly silt loam. Between depths of 13 and 33 inches, the subsoil is strong brown channery loam. A very firm and brittle layer of mottled, reddish brown very channery loam is at a depth of more than 33 inches.

Included with this soil in mapping are small areas of Buchanan and Meckesville soils. Also included are small areas of Allenwood soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Laidig soil is moderately slow, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is medium. A seasonal high water table is perched on the firm part of the subsoil at a depth of about 30 inches.

Most areas of this soil are cultivated. Some areas are used for woodland or pasture.

This soil is well suited to cultivated crops. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available for more desirable trees. Machine planting generally is practical on large areas.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. The permeability limits the soil as a site for septic tanks, and the water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3o.

LaC—Laidig gravelly loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on mountain foot slopes. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is yellowish brown gravelly loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper 5 inches of the subsoil is brownish yellow gravelly silt loam. Between depths of 13 and 33 inches, the subsoil is strong brown channery loam. A very firm and brittle layer of mottled, reddish brown very channery loam is at a depth of more than 33 inches.

Included with this soil in mapping are small areas of Buchanan, Meckesville, and Allenwood soils. Also included are small areas of Laidig soils with slopes of more than 15 percent. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Laidig soil is moderately slow, and the available water capacity is low or moderate. The erosion hazard is severe. Runoff is medium. A seasonal high water table is perched on the firm part of the subsoil at a depth of about 30 inches.

Most areas of this soil are in pasture. Some areas are cultivated or in woodland.

This soil is fairly suited to cultivated crops. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available for more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Figure 7.—An area of Laidig extremely stony loam, 0 to 8 percent slopes.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. The permeability limits the soil as a site for septic tanks, and the water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIe; the woodland ordination group is 3o.

LbB—Laidig extremely stony loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and well drained. It is on mountain foot slopes. The areas are irregular in shape and range mainly from 10 to 100 acres. Large stones cover 15 to 50 percent of the surface area (fig. 7).

Typically, the surface layer is yellowish brown gravelly loam about 1 inch thick. The subsoil extends to a depth of 60 inches or more. It is brownish yellow gravelly loam and gravelly silt loam between depths of 1 and 13 inches and is strong brown channery loam between depths of 13 and 33 inches. At a depth of more than 33 inches, it is a very firm and brittle layer of mottled, reddish brown very channery loam.

Included with this soil in mapping are small areas of Buchanan and Meckesville soils. Included areas make up about 20 percent of the unit and generally are less than 5 acres each.

The permeability of this Laidig soil is moderately slow, and the available water capacity is low or moderate. Runoff is medium. A seasonal high water table is perched on the firm part of the subsoil at a depth of 30 to 50 inches.

The stones on the surface make this soil generally unsuitable for farming. Most areas are wooded, and the soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water

available to more desirable trees. The stones on the surface make machine planting generally impractical.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is VIIs; the woodland ordination group is 3x.

LdD—Laidig and Meckesville extremely stony soils, 8 to 25 percent slopes. This unit consists of sloping and moderately steep, deep, well drained soils on mountain foot slopes. The areas are mainly in broad bands parallel to the mountain ridges and range mostly from 10 to 200 acres. Large stones cover 15 to 50 percent of the surface. Some areas consist mainly of Laidig soils, some mainly of Meckesville soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 45 percent Laidig soils, 35 percent Meckesville soils, and 20 percent other soils.

Typically, the Laidig soils have a surface layer of yellowish brown gravelly loam about 1 inch thick. The subsoil extends to a depth of 60 inches or more. The upper 12 inches of the subsoil is brownish yellow gravelly loam and gravelly silt loam. Between depths of 13 and 33 inches, the subsoil is strong brown channery loam. A very firm and brittle layer of mottled, reddish brown very channery loam is at a depth of more than 33 inches.

Typically, the Meckesville soils have a surface layer of dark brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. It is brown and reddish brown silt loam to a depth of 36 inches. At a depth of more than 36 inches, it is a very firm and brittle layer of reddish brown gravelly silty clay loam.

Included with these soils in mapping are small areas of Buchanan, Hazleton, Clymer, and Ungers soils. Included areas generally are less than 5 acres each.

The permeability of these Laidig and Meckesville soils is moderately slow. The available water capacity is low or moderate in the Laidig soils and moderate in the Meckesville soils. Runoff is medium. Both soils have a seasonal high water table perched above the firm part of the subsoil at a depth of about 30 inches.

The stones on the surface make these soils generally unsuitable for farming. The Laidig soils have moderately high productivity potential for trees, and the Meckesville soils have high productivity potential. Most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. The stones on the surface and slope restrict the use of equipment, and machine planting generally is not practical.

Slope and the seasonal high water table limit these soils for nonfarm use, including septic tank absorption fields. The seasonal high water table limits the soils as a site for buildings with basements, and slope is a limitation for building sites. The permeability is an additional limitation of the soils as a site for septic tanks.

The capability subclass is VIIs; the woodland ordination group is 3x for the Laidig soils and 2x for the Meckesville soils.

LdF—Laidig and Meckesville extremely stony soils, steep. This unit consists of deep, well drained soils on mountainsides. Slopes of the Laidig soils range from 25 to 45 percent, and slopes of the Meckesville soils range from 25 to 35 percent. The areas of the unit are in broad bands parallel to the mountain ridges and mainly range from 10 to 200 acres. Large stones cover 15 to 50 percent of the surface. Some areas consist mostly of Laidig soils, some mostly of Meckesville soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total acreage of this unit is about 40 percent Laidig soils, 30 percent Meckesville soils, and 30 percent other soils.

Typically, the Laidig soils have a surface layer of yellowish brown gravelly loam about 1 inch thick. The subsoil extends to a depth of 60 inches or more. The upper 12 inches of the subsoil is brownish yellow gravelly loam and gravelly silt loam. Between depths of 13 and 33 inches, the subsoil is strong brown channery loam. A very firm and brittle layer of mottled, reddish brown very channery loam is at a depth of more than 33 inches.

Typically, the Meckesville soils have a surface layer of dark brown silt loam about 4 inches thick. The subsoil extends to a depth of 60 inches or more. It is brown and reddish brown silt loam to a depth of 36 inches. At a depth of more than 36 inches, it is a very firm and brittle layer of reddish brown gravelly silty clay loam.

Included with these soils in mapping are small areas of Hazleton, Clymer, Dekalb, and Ungers soils. Also included are small areas of Dystrochrepts. Included areas make up about 30 percent of the unit and generally are less than 10 acres each.

The permeability of these Laidig and Meckesville soils is moderately slow. The available water capacity is low or moderate in the Laidig soils and moderate in the Meckesville soils. Runoff is rapid. Both soils have a seasonal high water table perched the firm part of the subsoil at a depth of about 30 inches.

The stones on the surface make these soils generally unsuitable for farming. The Laidig soils have moderately high productivity potential for trees, and the Meckesville soils have high productivity potential. Most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing

logging roads on the contour helps to reduce erosion. The stones on the surface and the slope restrict the use of equipment, and machine planting generally is not practical.

Slope and the seasonal high water table limit these soils for nonfarm use, including septic tank absorption fields. The seasonal high water table limits the soils as a site for buildings with basements, and slope is a limitation for building sites.

The capability subclass is VIIs; the woodland ordination group is 3x for the Laidig soils and 2x for the Meckesville soils.

LnB—Leck Kill shaly silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on hilltops and broad ridges. The areas are irregular in shape and range mainly from 4 to 30 acres.

Typically, the surface layer is reddish brown shaly silt loam about 10 inches thick. The subsoil is reddish brown and red shaly silt loam 33 inches thick. The substratum is reddish brown very shaly silt loam 13 inches thick. Shale bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Calvin, Klinesville, and Meckesville soils. Also included are small areas of soils similar to this Leck Kill soil but that contain more rock fragments. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Leck Kill soil is moderate or moderately rapid, and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is medium.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or buildings with basements.

The capability subclass is IIe; the woodland ordination group is 3o.

LnC—Leck Kill shaly silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on hillsides. The areas are irregular in shape and range mainly from 4 to 40 acres.

Typically, the surface layer is reddish brown shaly silt loam about 10 inches thick. The subsoil is reddish brown and red shaly silt loam 33 inches thick. The substratum is reddish brown very shaly silt loam 13 inches thick. Shale bedrock is at a depth of 56 inches.

Included with this soil in mapping are small areas of Calvin, Klinesville, and Meckesville soils. Also included are small areas of soils similar to this Leck Kill soil but that contain more rock fragments. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Leck Kill soil is moderate or moderately rapid, and the available water capacity is moderate or high. The erosion hazard is severe. Runoff is medium to rapid.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope and the depth to bedrock are the main limitations of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or as a building site.

The capability subclass is IIIe; the woodland ordination group is 3o.

LtC—Leetonia extremely stony loamy sand, 0 to 15 percent slopes. This soil is nearly level to sloping, deep, and well drained. It is on mountaintops. The areas are irregular in shape and range mainly from 10 to 50 acres. Large stones cover about 15 to 50 percent of the surface.

Typically, the surface layer is gray gravelly loamy sand about 5 inches thick. The subsoil is 16 inches thick. The upper 3 inches is dark brown and yellowish red gravelly loamy coarse sand. The lower 13 inches is strong brown gravelly coarse loamy sand and very gravelly coarse sand. The substratum is brownish yellow, yellow, pale brown, and pale yellow very gravelly sand and gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Dekalb and Hazleton soils. Included areas make up

about 15 percent of the unit and generally are less than 5 acres each.

The permeability of this Leetonia soil is rapid, and the available water capacity is very low. Runoff is slow.

The stones on the surface make this soil generally unsuitable for farming. Most areas are wooded, but the soil has low potential productivity for trees. Removal of undesirable species will increase the water available to more desirable trees. The stones on the surface limit use of equipment, and machine planting generally is not practical.

The stones on the surface and the rapid permeability limit this soil for most nonfarm uses. In some areas bedrock is at a depth of less than 60 inches and is a limitation for nonfarm use.

The capability subclass is VIIs; the woodland ordination group is 5x.

Lw—Linden silt loam. This soil is nearly level, deep, and well drained. It is on flood plains. Slopes range from 0 to 3 percent. The areas are long and narrow and mainly range from 5 to 20 acres. They commonly are flooded.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 38 inches thick. The upper 17 inches is dark brown fine sandy loam. The lower 21 inches is reddish brown silt loam. The substratum is brown fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Barbour and Basher soils. Also included are small areas of soils similar to this Linden soil but that have a surface layer of gravelly silt loam. Included areas make up about 15 percent of the unit and generally are less than 3 acres each.

The permeability of this Linden soil is moderately rapid to rapid, and the available water capacity is high. Runoff is slow.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is well suited to cultivated crops. Flooding is a hazard to some crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth and reduce the hazard of flood erosion.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has very high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Flooding sometimes restricts the use of equipment, but machine planting generally is practical on large areas.

Flooding is the main limitation of the soil for most nonfarm uses.

The capability class is I; the woodland ordination group is 1o.

MkB—Meckesville silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on hills and ridges. The areas are irregular in shape and range mainly from 3 to 100 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 8 and 36 inches, it is reddish brown silt loam. At a depth of more than 36 inches, it is a very firm layer of reddish brown gravelly silty clay loam.

Included with this soil in mapping are small areas of Leck Kill, Calvin, Allenwood, and Albrights soils. Also included are small areas of Meckesville soils with a surface layer of gravelly silt loam. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Meckesville soil is moderately slow, and the available water capacity is moderate. The erosion hazard is moderate. Runoff is medium. A seasonal water table is perched on the firm part of the subsoil at a depth of about 35 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The moderately slow permeability and the seasonal high water table are the main limitations of this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 2o.

MkC—Meckesville silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and well drained. It is on hills and ridges. The areas are irregular in shape and range mainly from 3 to 40 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of

60 inches or more. Between depths of 8 and 36 inches, it is reddish brown silt loam. At a depth of more than 36 inches, it is a very firm layer of reddish brown gravelly silty clay loam.

Included with this soil in mapping are small areas of Leck Kill, Calvin, and Allenwood soils. Also included are small areas of Meckesville soils with a surface layer of gravelly silt loam. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Meckesville soil is moderately slow, and the available water capacity is moderate. The erosion hazard is severe. Runoff is medium to rapid. A seasonal water table is perched on the firm part of the subsoil at a depth of about 35 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a main pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope and the seasonal high water table are the main limitations of the soil for nonfarm use. Slope limits the soil as a building site, and the water table is a limitation of the soil as a site for septic tanks and buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIe; the woodland ordination group is 2o.

MkD—Meckesville silt loam, 15 to 25 percent slopes. This soil is moderately steep, deep, and well drained. It is on hills and ridges. The areas are long and narrow and range mainly from 3 to 25 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. Between depths of 8 and 36 inches, it is reddish brown silt loam. At a depth of more than 36 inches, it is a very firm and brittle layer of reddish brown gravelly silty clay loam.

Included with this soil in mapping are small areas of Leck Kill, Calvin, and Allenwood soils. Also included are small areas of Meckesville soils with a surface layer of gravelly silt loam. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Meckesville soil is moderately slow, and the available water capacity is moderate. The erosion hazard is very severe. Runoff is rapid. A seasonal water table is perched on the firm part of the subsoil at a depth of 30 to 48 inches.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is fairly suited to cultivated crops. The very severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

Slope and the seasonal high water table are the main limitations of the soil for nonfarm use. Both limit the soil as a site for septic tanks. Slope limits the soil as a building site, and the seasonal high water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IVe; the woodland ordination group is 2r.

MoA—Monongahela silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and moderately well drained. It is on stream terraces. The areas are irregular in shape and range mainly from 3 to 90 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 38 inches thick. The upper 13 inches is yellowish brown silt loam. The lower 25 inches is a very firm layer of mottled, dark brown and yellowish brown loam. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Wheeling and rarely flooded Holly soils. Also included are small areas of soils similar to this Monongahela soil but that are somewhat poorly drained or that do not have a firm layer in the subsoil. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Monongahela soil is slow or moderately slow, and the available water capacity is moderate. The erosion hazard is slight. Runoff is slow. A seasonal high water table is perched on the firm part of the subsoil at a depth of 18 to 36 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The seasonal high water table is the main limitation for crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. Use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a main pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species is a suitable management practice. Use of equipment is restricted by the seasonal high water table. Machine planting is generally practical on large areas.

The seasonal high water table and slow or moderately slow permeability are the main limitations of this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIw; the woodland ordination group is 3o.

MoB—Monongahela silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on stream terraces. The areas are irregular in shape and range mainly from 3 to 50 acres.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil is 38 inches thick. The upper 13 inches is yellowish brown silt loam. The lower 25 inches is a very firm layer of mottled, dark brown and yellowish brown loam. The substratum is mottled, dark brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Wheeling and rarely flooded Holly soils. Also included are small areas of soils similar to this Monongahela soil but that are somewhat poorly drained or that do not have a firm layer in the subsoil. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Monongahela soil is slow or moderately slow, and the available water capacity is moderate. The erosion hazard is moderate. Runoff is slow. A seasonal high water table is perched on the firm part of the subsoil at a depth of 18 to 36 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. Use of surface and subsurface drainage allows timely tillage.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is the main pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. The seasonal high water table limits the use of equipment, but machine planting generally is practical on large areas.

The seasonal high water table and slow or moderately slow permeability are the main limitations of this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3o.

OpB—Opequon silty clay loam, 3 to 8 percent slopes. This soil is gently sloping, shallow, and well drained. It is on limestone ridges. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is dark brown silty clay loam about 5 inches thick. The subsoil is 11 inches thick. The upper 8 inches is yellowish red silty clay, and the lower 3 inches is reddish brown channery silty clay. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas of Hagerstown and Edom soils. Also included are small areas of soils similar to this Opequon soil but that have bedrock between depths of 20 and 30 inches, areas of soils with a channery surface layer, and areas of rock outcrop. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Opequon soil is moderate or moderately slow, and the available water capacity is low or very low. The erosion hazard is severe. Runoff is medium. Rooting is restricted by bedrock at a depth of 12 to 20 inches.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop

residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is the main pasture management concerns. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. The rate of seedling mortality caused by the low available water capacity is a major management concern. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of this soil for nonfarm use, especially for use of the soil as a site for septic tanks or buildings with basements.

The capability subclass is IIIe; the woodland ordination group is 3c.

OpD—Opequon silty clay loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, shallow, and well drained. It is on limestone ridges. The areas are irregular in shape and range mainly from 3 to 40 acres.

Typically, the surface layer is dark brown silty clay loam about 5 inches thick. The subsoil is 11 inches thick. The upper 8 inches is yellowish red silty clay, and the lower 3 inches is reddish brown channery silty clay. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas of Hagerstown, Elliber, and Edom soils. Also included are small areas of soils similar to this Opequon soil but that have bedrock between depths of 20 and 30 inches, areas of soils with a channery surface layer, and areas of rock outcrop. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Opequon soil is moderate or moderately slow, and the available water capacity is low or very low. The erosion hazard is very severe. Runoff is medium to rapid. Rooting is restricted by bedrock at a depth of 12 to 20 inches.

Most areas of this soil are in pasture or hay. Some areas are used for cultivated crops.

The very severe erosion hazard makes this soil poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is the main pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Constructing logging roads on the contour helps to reduce erosion. The rate of seedling mortality caused by the low available water capacity is a major management concern. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

Slope and the depth to bedrock are the main limitations of this soil for nonfarm use. Both limit the soil as a site for septic tanks and as a building site.

The capability subclass is IVe; the woodland ordination group is 3c.

OpE—Opequon silty clay loam, 25 to 50 percent slopes. This soil is steep, shallow, and well drained. It is on limestone ridges. The areas are long and narrow and range mainly from 3 to 75 acres.

Typically, the surface layer is dark brown silty clay loam about 5 inches thick. The subsoil is 11 inches thick. The upper 8 inches is yellowish red silty clay, and the lower 3 inches is reddish brown channery silty clay. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas of Elliber soils, rock outcrops, soils similar to this Opequon soil but that have bedrock between depths of 20 and 30 inches, and soils with a channery surface layer. Included areas make up about 25 percent of the unit and generally are less than 3 acres each.

The permeability of this Opequon soil is moderate or moderately slow, and the available water capacity is low or very low. Runoff is rapid. Rooting is restricted by bedrock at a depth of 12 to 20 inches.

Most areas of this soil are wooded. Some areas are used for pasture.

Slope makes this soil generally unsuitable for cultivated crops. This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is the main pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Constructing logging roads on the contour helps to reduce erosion. The rate of seedling mortality caused by the low available water capacity is a major management concern. Removal of undesirable species will increase the water available to more desirable trees. Slope limits the use of equipment, and machine planting generally is not practical.

Slope and the depth to bedrock limit this soil for most nonfarm uses.

The capability subclass is VIIe; the woodland ordination group is 3c.

Pa—Pits. This unit consists of areas that have been or are being mined for sand and gravel or shale. These areas generally contain little or no soil material and do not support vegetation, but some areas have been leveled or filled. Slopes range mainly from 0 to 80 percent. The walls of some pits are nearly vertical. The slope, permeability, and water in some of the pits are the main limitations of the unit. Onsite investigation is necessary to determine the suitability of the unit for most uses.

This unit is not assigned to a capability subclass or woodland group.

Qu—Quarries. This unit consists of areas that have been or are being mined for limestone. These areas contain little or no soil material and do not support vegetation. Slopes mainly range from 0 to 80 percent. The walls of some quarries are nearly vertical. Slope is the main limitation of the unit. Onsite investigation is necessary to determine the suitability of the unit for most uses.

This unit is not assigned to a capability subclass or woodland group.

Ru—Rubble land. This unit consists of areas where more than 90 percent of the surface is covered with stones and boulders. These areas are nearly free of vegetation. Slopes range from 25 to 75 percent. The stones and slope limit the unit for most uses.

This unit is not assigned to a capability subclass or woodland ordination group.

ShA—Shelmadine silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and poorly drained. It is in depressions and along drainageways. The areas are irregular in shape and range mainly from 3 to 200 acres.

Typically, the surface layer is dark gray silt loam about 5 inches thick. The subsoil is 46 inches thick. The upper 24 inches is mottled, gray and grayish brown silty clay loam. The lower 22 inches is a very firm layer of mottled, brown channery loam. The substratum is mottled, brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alvira, Watson, and Albrights soils. Also included are small areas of rarely flooded Holly soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Shelmadine soil is slow, and the available water capacity is low or moderate. The erosion hazard is slight. Runoff is slow. A high water table is between the surface and a depth of 6 inches in winter and spring.

Most areas of this soil are in pasture. Some areas are used for woodland or cultivated crops.

The high water table makes this soil poorly suited to cultivated crops and pasture. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. In some years the high water table interferes with seeding and harvesting, but the use of surface and subsurface drainage allows timely tillage.

The prevention of overgrazing or grazing when the soil is wet is the major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. The high water table restricts the use of equipment, but machine planting generally is practical on large areas.

The high water table and slow permeability are the main limitations of the soil for nonfarm use, especially for use as a site for septic tanks and buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IVw; the woodland ordination group is 3w.

ShB—Shelmadine silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and poorly drained. It is in depressions and along drainageways. The areas are irregular in shape and range mainly from 3 to 150 acres.

Typically, the surface layer is dark gray silt loam about 5 inches thick. The subsoil is 46 inches thick. The upper 24 inches is mottled, gray and grayish brown silty clay loam. The lower 22 inches is a very firm layer of mottled, brown channery loam. The substratum is mottled, brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alvira, Watson, and Albrights soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Shelmadine soil is slow, and the available water capacity is low or moderate. The erosion hazard is moderate. Runoff is slow. A high water table is between the surface and a depth of 6 inches in winter and spring.

Most areas of this soil are in pasture. Some areas are used for woodland or cultivated crops.

The high water table and moderate erosion hazard make this soil poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. In some years the high water table interferes with seeding and harvesting, but the use of surface and subsurface drainage allows timely tillage.

The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. The high water table restricts the use of equipment, but machine planting generally is practical on large areas.

The high water table and slow permeability are the main limitations of the soil for nonfarm use, especially for use as a site for septic tanks and buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IVw; the woodland ordination group is 3w.

SmB—Shelmadine very stony silt loam, 0 to 8 percent slopes. This soil is nearly level and gently sloping, deep, and poorly drained. It is in depressions, along drainageways, and on mountain foot slopes. The areas are irregular in shape and range mainly from 3 to 200 acres. Large stones cover about 3 to 15 percent of the surface area.

Typically, the surface layer is dark gray silt loam about 5 inches thick. The subsoil is 46 inches thick. The upper 24 inches is mottled, gray and grayish brown silty clay loam. The lower 22 inches is a very firm and brittle layer of mottled, brown channery loam. The substratum is mottled, brown channery loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alvira, Watson, and Buchanan soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Shelmadine soil is slow, and the available water capacity is low or moderate. Runoff is slow. A seasonal high water table is between the surface and a depth of about 6 inches in winter and spring. Rooting is restricted by the firm part of the subsoil at a depth of 18 to 30 inches.

The stones on the surface and the seasonal high water table make the soil generally unsuitable for farming. The soil has moderately high productivity potential for trees, and most areas are wooded. The seasonal high water table limits the use of equipment, and machine planting generally is not practical.

The seasonal high water table and slow permeability limit this soil for nonfarm use. Both limit the soil as a site for septic tanks. The water table is a limitation of the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is VIIs; the woodland ordination group is 3w.

Ug—Udifluvents and Fluvaquents, gravelly. This unit consists of nearly level, deep, excessively drained to very poorly drained soils near streams and rivers and on islands. The areas generally are long and narrow and range from about 3 to 40 acres. They are subject to frequent or occasional flooding. Slopes range from 0 to 3 percent. Some areas are comprised mainly of Udifluvents, some mainly of Fluvaquents, and some of both. The mapped acreage of the unit is about 40 percent Udifluvents, 30 percent Fluvaquents, and 30 percent other soils. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer of the Udifluvents ranges from 1 to 6 inches thick. It is loamy sand to silt loam. The substratum is sandy loam or loam and extends to a depth of 60 inches or more.

Typically, the surface layer of the Fluvaquents ranges from 1 to 8 inches thick. It is sandy loam to silt loam. The substratum is sandy loam to silty clay loam and extends to a depth of 60 inches or more.

Included in mapping are areas of Holly soils, some of which have water on the surface; Barbour soils; and Linden soils. Also included are areas that are sand or loamy sand throughout. Included areas make up about 35 percent of this unit and generally are less than 5 acres each.

The Udifluvents have moderate to rapid permeability, and the Fluvaquents have moderately slow to slow permeability. The available water capacity is moderate, low, or very low.

Most areas of this unit are in woodland. Some small areas are used for pasture. The hazard of flooding is the main limitation of the soils for most uses, but onsite investigation generally is necessary to determine the potential of the unit for any use.

This unit is not assigned to a capability subclass or woodland ordination group.

UoB—Ungers very stony loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and well drained. It is on mountaintops. The areas are irregular in shape and range mainly from 5 to 200 acres. Large stones cover about 3 to 15 percent of the surface.

Typically, the surface layer is very dark brown channery loam about 2 inches thick. The subsoil is 38 inches thick. The upper 6 inches of the subsoil is dark brown channery loam. The next 26 inches is reddish brown channery sandy clay loam. The lower 6 inches is dark reddish brown channery sandy loam. The substratum is dark reddish brown very channery sandy loam to a depth of 54 inches. Sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are small areas of Clymer, Hazleton, Dekalb, and Leetonia soils. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Ungers soil is moderate, and the available water capacity is moderate or high. Runoff is medium.

The stones on the surface make this soil generally unsuitable for farming. The soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. The stones on the surface make machine planting generally impractical.

In places the depth to bedrock is a limitation for nonfarm uses, especially for use of the soil as a site for septic tanks and buildings with basements.

The capability subclass is VIs; the woodland ordination group is 3o.

UoD—Ungers very stony loam, 8 to 25 percent slopes. This soil is sloping and moderately steep, deep, and well drained. It is on mountainsides. The areas are irregular in shape and range mainly from 5 to 200 acres. Large stones cover about 3 to 15 percent of the surface.

Typically, the surface layer is very dark brown channery loam about 2 inches thick. The subsoil is 38 inches thick. The upper 6 inches of the subsoil is dark brown channery loam. The next 26 inches is reddish brown channery sandy clay loam. The lower 6 inches is dark reddish brown channery sandy loam. The substratum is dark reddish brown very channery sandy loam to a depth of 54 inches. Sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are small areas of Clymer, Meckesville, Hazleton, Laidig, and Dekalb soils. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Ungers soil is moderate, and the available water capacity is moderate high. Runoff is medium to rapid.

Slope and the stones on the surface make this soil generally unsuitable for farming. The soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope and the stones on the surface limit the use of equipment, and machine planting generally is not practical.

Slope and, in places, the depth to bedrock are the main limitations of the soil for nonfarm use. Both limit the soil as a site for septic tanks and buildings, and the depth to bedrock is a limitation of the soil as a site for buildings with basements.

The capability subclass is VIIs; the woodland ordination group is 3r.

UoE—Ungers very stony loam, 25 to 50 percent slopes. This soil is steep, deep, and well drained. It is on mountainsides. The areas are irregular in shape and range mainly from 10 to 200 acres. Large stones cover about 3 to 15 percent of the surface.

Typically, the surface layer is very dark brown channery loam about 2 inches thick. The subsoil is 38 inches thick. The upper 6 inches of the subsoil is dark brown channery loam. The next 26 inches is reddish brown channery sandy clay loam. The lower 6 inches is dark reddish brown channery sandy loam. The substratum is dark reddish brown very channery sandy loam to a depth of 54 inches. Sandstone bedrock is at a depth of 54 inches.

Included with this soil in mapping are small areas of Clymer, Hazleton, Dekalb, and Leetonia soils. Included areas make up about 25 percent of the unit and generally are less than 5 acres each.

The permeability of this Ungers soil is moderate, and the available water capacity is moderate or high. Runoff is rapid.

Slope and the stones on the surface make this soil generally unsuitable for farming. The soil has moderately high productivity potential for trees, and most areas are wooded. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope and the stones on the surface limit the use of equipment, and machine planting generally is not practical.

Slope and, in places, the depth to bedrock are the main limitations of the soil for nonfarm use. Both limit the soil as a site for septic tanks and buildings, and the depth to bedrock is a limitation of the soil as a site for buildings with basements.

The capability subclass is VIIs; the woodland ordination group is 3r.

WaB—Washington silt loam, wet substratum, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on broad hills. The areas are irregular in shape and range mainly from 4 to 200 acres.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is 40 inches thick. The upper 30 inches is strong brown gravelly silty clay loam and gravelly clay loam. The lower 10 inches is mottled, yellowish brown gravelly clay loam. The substratum is mottled, brownish yellow clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Hagerstown, Edom, and Kreamer soils. Also included are small areas of nearly level Washington soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Washington soil is moderately slow, and the available water capacity is high. The erosion hazard is moderate. A seasonal high water table is at a depth of about 18 to 36 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard and seasonal high water table are the main limitations for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth. The use of surface and subsurface drainage allows timely tillage.

This soil is well suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The seasonal high water table is the main limitation of the soil for nonfarm use, especially for use as a site for buildings with basements or for septic tanks. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 2o.

WbA—Watson silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and moderately well drained. It is on the tops of hills and ridges. The areas are irregular in shape and range mainly from 3 to 100 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 36 inches thick. The upper 18 inches is yellowish red gravelly silty clay loam. The lower 18 inches is a very firm layer of mottled, strong brown gravelly silty clay loam and gravelly clay loam. The substratum is mottled, light yellowish brown and strong brown loam and shaly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Allenwood, Washington, and Alvira soils. Included areas make up about 20 percent of this unit and generally are less than 3 acres each.

The permeability of this Watson soil is slow, and the available water capacity is moderate. The erosion hazard is slight. Runoff is medium. A seasonal high water table is at a depth of 18 to 36 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The slow permeability and seasonal high water table limit this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIw; the woodland ordination group is 3o.

WbB—Watson silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and moderately well drained. It is on hills and ridges. The areas are irregular in shape and range mainly from 3 to 80 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 36 inches thick. The upper 18 inches is yellowish red gravelly silty clay loam. The lower 18 inches is a very firm layer of mottled, strong brown gravelly silty clay loam and gravelly clay loam. The substratum is mottled, light yellowish brown and strong brown loam and shaly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Allenwood, Alvira, and Buchanan soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Watson soil is slow, and the available water capacity is moderate. The erosion hazard is moderate. Runoff is medium. A seasonal high water table is at a depth of 18 to 36 inches.

This soil is well suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The slow permeability and seasonal high water table limit this soil for nonfarm use. Both limit the soil as a site for septic tanks, and the water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIe; the woodland ordination group is 3o.

WbC—Watson silt loam, 8 to 15 percent slopes. This soil is sloping, deep, and moderately well drained. It is on hills. The areas are irregular in shape and range mainly from 3 to 30 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 36 inches thick. The upper 18 inches is yellowish red gravelly silty clay loam. The lower 18 inches is a very firm layer of mottled, strong brown gravelly silty clay loam and gravelly clay loam. The substratum is mottled, light yellowish brown and strong brown loam and shaly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Allenwood and Alvira soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Watson soil is slow, and the available water capacity is moderate. The erosion hazard is severe. Runoff is medium. A seasonal high water table is at a depth of 18 to 36 inches.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderately high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope, the slow permeability, and the seasonal high water table are the main limitations of the soil for nonfarm use, especially for use as a site for septic tanks and buildings. The water table limits the soil as a site for buildings with basements. If buildings with basements are constructed, foundation drains help to prevent seepage of water into the basements.

The capability subclass is IIIe; the woodland ordination group is 3o.

WeB—Weikert shaly silt loam, 3 to 8 percent slopes. This soil is gently sloping, shallow, and well drained. It is on ridges. The areas are irregular in shape and range mainly from 3 to 30 acres.

Typically, the surface layer is very dark grayish brown shaly silt loam about 7 inches thick. The subsoil is dark yellowish brown very shaly silt loam 3 inches thick. The substratum is dark yellowish brown very shaly loam 5 inches thick. Shale bedrock is at a depth of 15 inches (fig. 8).

Included with this soil in mapping are small areas of Klinesville, Berks, and Hartleton soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Weikert soil is moderately rapid, and the available water capacity is very low. The erosion hazard is severe. Runoff is slow. Rooting is restricted by bedrock at a depth of 10 to 20 inches.

Most areas of this soil are cultivated. Some areas are used for pasture.

This soil is fairly suited to cultivated crops. The severe erosion hazard and very low available water capacity are the main limitations for crops. Contour stripcropping,

Figure 8.—This area of Weikert shaly silt loam, 3 to 8 percent slopes, has shale bedrock at a depth of about 15 inches.

minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

This soil is fairly suited to pasture. The prevention of overgrazing or grazing when the soil is wet is a major pasture management concern. If the pasture is grazed when the soil is wet, the surface layer becomes compacted. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderate productivity potential for trees. The very low available water capacity causes a high rate of seedling mortality. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of the soil for nonfarm use, especially for use as a site for septic tanks and buildings with basements.

The capability subclass is IIIe; the woodland ordination group is 4d.

WeC—Weikert shaly silt loam, 8 to 15 percent slopes. This soil is sloping, shallow, and well drained. It is on ridges. The areas are irregular in shape and range mainly from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown shaly silt loam about 7 inches thick. The subsoil is dark yellowish brown very shaly silt loam 3 inches thick. The substratum is dark yellowish brown very shaly loam 5 inches thick. Shale bedrock is at a depth of 15 inches.

Included with this soil in mapping are small areas of Klinesville, Berks, and Hartleton soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Weikert soil is moderately rapid, and the available water capacity is very low. The erosion hazard is very severe. Runoff is slow. Rooting is restricted by bedrock at a depth of 10 to 20 inches.

Most areas of this soil are cultivated. Some areas are used for pasture.

The very severe erosion hazard and very low available water capacity make this soil poorly suited to cultivated crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

The very low available water capacity makes this soil poorly suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderate productivity potential for trees. The very low available water capacity causes a high rate of seedling mortality. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

The depth to bedrock is the main limitation of the soil for nonfarm use, especially for use as a site for septic tanks and buildings with basements.

The capability subclass is IVe; the woodland ordination group is 4d.

WeD—Weikert shaly silt loam, 15 to 25 percent slopes. This soil is moderately steep, shallow, and well drained. It is on ridges. The areas are long and narrow and range mainly from 3 to 20 acres.

Typically, the surface layer is very dark grayish brown shaly silt loam about 7 inches thick. The subsoil is dark yellowish brown very shaly silt loam 3 inches thick. The substratum is dark yellowish brown very shaly loam 5 inches thick. Shale bedrock is at a depth of 15 inches.

Included with this soil in mapping are small areas of Klinesville, Berks, and Hartleton soils. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Weikert soil is moderately rapid, and the available water capacity is very low. Runoff is medium to rapid. Rooting is restricted by bedrock at a depth of 10 to 20 inches.

Most areas of this soil are wooded. Some areas are used for pasture.

Slope makes this soil generally unsuitable for cultivated crops and poorly suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderate productivity potential for trees. The very low available water capacity causes a high rate of seedling mortality. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Slope limits the use of equipment, but machine planting generally is practical on large areas.

The depth to bedrock and slope limit this soil for most nonfarm uses.

The capability subclass is VIe; the woodland ordination group is 4d.

WkE—Weikert and Klinesville shaly silt loams, steep. This unit consists of shallow, well drained soils on ridges. Slopes range from 25 to 75 percent. The areas are long and narrow and range mainly from 3 to 50 acres. Some consist mainly of Weikert soils, some mainly of Klinesville soils, and some of both. The soils were mapped together because they have no major differences in use and management. The total mapped

acreage of the unit is about 50 percent Weikert soils, 20 percent Klinesville soils, and 30 percent other soils.

Typically, the Weikert soils have a surface layer of very dark grayish brown shaly silt loam about 7 inches thick. The subsoil is dark yellowish brown very shaly silt loam 3 inches thick. The substratum is dark yellowish brown very shaly loam 5 inches thick. Shale bedrock is at a depth of 15 inches.

Typically, the Klinesville soils have a surface layer of dusky red shaly silt loam about 3 inches thick. The subsoil is weak red very shaly silt loam 8 inches thick. The substratum is weak red very shaly silt loam 6 inches thick. Shale bedrock is at a depth of 17 inches.

Included with these soils in mapping are small areas of Berks, Calvin, Leck Kill, and Hartleton soils. Also included are small areas of Udifluvents and Fluvaquents. Included areas make up about 30 percent of the unit and generally are less than 5 acres each.

The permeability of these Weikert and Klinesville soils is moderately rapid, and the available water capacity is very low. Runoff is rapid. Rooting is restricted in both soils by bedrock at a depth of 10 to 20 inches.

Slope makes these soils generally unsuitable for farming and is the main limitation for nonfarm use. The productivity potential of these soils for trees is moderate on north-facing slopes and low on south-facing slopes. Most areas are wooded. Removal of undesirable species will increase the water available to more desirable species. Constructing logging roads on the contour helps to control erosion. Slope limits the use of equipment and makes machine planting generally impractical.

The capability subclass is VIIs; the woodland ordination group is 4d for north aspect and 5d for south aspect.

WsA—Wheeling soils, 0 to 3 percent slopes. This unit consists of nearly level, deep, well drained soils on terraces. The areas are irregular in shape and range mainly from 5 to 50 acres. Some of the Wheeling soils in this unit have a surface layer of silt loam, some have a surface layer of loam, and some have a surface layer of fine sandy loam. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsurface layer is dark grayish brown silt loam about 10 inches thick. The subsoil is 23 inches thick. The upper 17 inches is yellowish brown and brown loam. The lower 6 inches is dark brown fine sandy loam. The substratum is dark brown gravelly sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Monongahela and Wyoming soils that make up about 20 percent of the unit and that generally are less than 3 acres each.

The permeability of these Wheeling soils is moderate in the subsoil and rapid in the substratum. The available water capacity is moderate or high. The erosion hazard is slight. Runoff is slow.

Most areas of these soils are cultivated. Some areas are used for building sites.

These soils are well suited to cultivated crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The rapid permeability in the substratum causes a hazard of ground-water pollution in areas of these soils used as a site for septic tanks.

The capability class is I; the woodland ordination group is 2o.

WsB—Wheeling soils, 3 to 8 percent slopes. This unit consists of gently sloping, deep, well drained soils on terraces. The areas are irregular in shape and range mainly from 5 to 100 acres. Some of the Wheeling soils in this unit have a surface layer of silt loam, some have a surface layer of loam, and some have a surface layer of fine sandy loam. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsurface is dark grayish brown silt loam about 10 inches thick. The subsoil is 23 inches thick. The upper 17 inches is yellowish brown and brown loam. The lower 6 inches is dark brown fine sandy loam. The substratum is dark brown gravelly sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Monongahela and Wyoming soils that make up about 20 percent of the unit and that generally are less than 3 acres each.

The permeability of these Wheeling soils is moderate in the subsoil and rapid in the substratum. The available water capacity is moderate or high. The erosion hazard is moderate. Runoff is slow.

Most areas of these soils are cultivated. Some areas are used for building sites.

These soils are well suited to cultivated crops. The moderate erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, terraces, grassed waterways, diversions, and cover crops help to reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The rapid permeability in the substratum causes a hazard of ground-water pollution in areas of these soils used as a site for septic tanks.

The capability class is IIe; the woodland ordination group is 2o.

WsC—Wheeling soils, 8 to 15 percent slopes. These soils are sloping, deep, and well drained. They are on terraces. The areas are irregular in shape and range mainly from 5 to 20 acres. Some of the Wheeling soils in this unit have a surface layer of silt loam, some have a surface layer of loam, and some have a surface layer of fine sandy loam. The soils were mapped together because they have no major differences in use and management.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsurface is dark grayish brown silt loam about 10 inches thick. The subsoil is 23 inches thick. The upper 17 inches is yellowish brown and brown loam. The lower 6 inches is dark brown fine sandy loam. The substratum is dark brown gravelly sand to a depth of 60 inches or more.

Included with these soils in mapping are small areas of Allenwood and Wyoming soils that make up about 20 percent of the unit and that generally are less than 3 acres each.

The permeability of these Wheeling soils is moderate in the subsoil and rapid in the substratum. The available water capacity is moderate or high. The erosion hazard is severe. Runoff is medium.

These soils are well suited to cultivated crops and most areas are cultivated. The severe erosion hazard is the main limitation for crops. Contour stripcropping, minimum tillage, grassed waterways, diversions, and cover crops help reduce runoff and control erosion. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

These soils have a high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Constructing logging roads on the contour helps to reduce erosion. Machine planting generally is practical on large areas.

Slope is the main limitation of these soils for nonfarm use, especially for use as site for buildings or septic tanks. The rapid permeability in the substratum causes a hazard of ground-water contamination in areas used as a site for the septic systems.

The capability subclass is IIIe; the woodland ordination group is 2o.

WyB—Wyoming gravelly sandy loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and somewhat excessively drained. It is on terraces. The areas are irregular in shape and range mainly from 4 to 20 acres.

Typically, the surface layer is dark brown gravelly sandy loam about 10 inches thick. The subsoil is 16 inches thick. The upper 12 inches is brown gravelly coarse sandy loam. The lower 4 inches is brown very gravelly sandy loam. The substratum is dark brown very gravelly loamy coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Barbour and Wheeling soils. Also included are small areas of Wyoming soils that are less than 15 percent gravel in the surface layer. Included areas make up about 20 percent of the unit and generally are less than 3 acres each.

The permeability of this Wyoming soil is rapid, and the available water capacity is very low or low. The erosion hazard is moderate.

This soil is fairly suited to cultivated crops, and most areas are cultivated. The moderate erosion hazard is the main limitation for crops. Incorporating crop residue into the soil and using grasses and legumes and cover crops in the cropping system help to maintain organic matter content and tilth.

These soils are well suited to pasture. The prevention of overgrazing is a major pasture management concern. Use of proper stocking rates, deferred grazing, rotational grazing, and nutrients help to maintain desirable plant species.

This soil has moderate productivity potential for trees. The very low or low available water capacity is the main limitation. Removal of undesirable species will increase the water available to more desirable trees. Machine planting generally is practical on large areas.

The rapid permeability in the substratum causes a hazard of ground-water pollution in areas of this soil used as a site for septic tanks.

The capability subclass is IIIs; the woodland ordination group is 4f.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and water supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of water from precipitation or irrigation. It also has favorable temperature and growing season and acceptable acidity or alkalinity. It has few or no stones or rock outcrops and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope range is mainly from 0 to 8 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 37,000 acres, or nearly 18 percent of Union County, meets the soil requirements for prime farmland. Areas are scattered throughout the county but mainly are in associations 3, 6, and 8 of the general soil map. Most of this prime farmland is used for crops, mainly corn and soybeans.

A recent trend in land use in some parts of the county has been toward the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate and usually are less productive.

The soil map units that make up prime farmland in Union County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

AbB—Albrights silt loam, 3 to 8 percent slopes
AnA—Allenwood gravelly silt loam, 0 to 3 percent slopes
AoB—Allenwood & Washington soils, 3 to 8 percent slopes
Ba—Barbour soils, frequently flooded
Bb—Barbour-Linden complex, rarely flooded
Bc—Basher soils
BeB—Bedington silt loam, 3 to 8 percent slopes
BuB—Buchanan gravelly loam, 3 to 8 percent slopes
EdB—Edom complex, 3 to 8 percent slopes
EsB—Elliber cherty silt loam, 3 to 8 percent slopes
EtB—Elliber very cherty silt loam, 3 to 8 percent slopes
HaB—Hagerstown silt loam, 3 to 8 percent slopes
HtB—Hartleton channery silt loam, 3 to 8 percent slopes
KmB—Kreamer cherty silt loam, 3 to 8 percent slopes
LaB—Laidig gravelly loam, 3 to 8 percent slopes
LnB—Leck Kill shaly silt loam, 3 to 8 percent slopes
Lw—Linden silt loam
MkB—Meckesville silt loam, 3 to 8 percent slopes
MoA—Monongahela silt loam, 0 to 3 percent slopes
WaB—Washington silt loam, wet substratum, 3 to 8 percent slopes
WbA—Watson silt loam, 0 to 3 percent slopes
WbB—Watson silt loam, 3 to 8 percent slopes
WsA—Wheeling soils, 0 to 3 percent slopes
WsB—Wheeling soils, 3 to 8 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

John C. Spitzer, conservation agronomist, Soil Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Farming is a major land use in Union County. There were over 72,900 acres used for crops and pasture in the county in 1975, according to the Conservation Needs Inventory. Of this total, 6,613 acres were used for permanent pasture. The 1978 Pennsylvania Crop and Livestock Annual Summary lists 24,200 acres of corn in the county, 10,650 acres of small grain, 12,000 acres of alfalfa and other hay, 300 acres in orchards and vineyards, and the rest in other cropland and pasture. Although corn is the major row crop, soybeans and tomatoes are sometimes grown. Wheat, oats, and barley are the common close-growing crops.

Erosion is the major soil management concern on most of the cropland and pasture in Union County. Soil erosion causes sedimentation of streams and reservoirs, resulting in reduced water quality for all uses.

Loss of topsoil by erosion further causes reduced production, especially on soils that are shallow or moderately deep to bedrock, soils with a firm underlying layer, and soils with low available water capacity. Watson, Alvira, and Shelmadine soils are examples of soils with a firm underlying layer. Weikert and Berks soils, for example, have low available water capacity and are shallow and moderately deep, respectively.

The original surface layer of many sloping soils has been eroded away, leaving a high content of channery and cherty fragments in the surface layer. Preparing a seedbed and tilling are difficult in these areas. Areas of Hartleton and Elliber soils commonly are in this condition.

Hagerstown, Washington, and Edom soils are among the most productive soils in the county but are highly susceptible to erosion. On these and other soils, conservation and erosion-control practices are needed to provide protective cover, reduce surface water runoff and sedimentation, and increase infiltration. A cropping system that provides plant cover helps to protect the soils. Some erosion-reducing practices on pasture and hayland are deferred grazing, rotational grazing, and the

use of grasses and legumes. Contour farming, terraces, diversions, minimum tillage, and using crop residue are practices that help to reduce erosion in cultivated areas and that are suitable for most soils except for steep and irregularly sloping soils, which are not suitable for terraces.

Drainage is a major management concern on some of the soils in Union County. Some soils are so poorly drained that crop production is not practical without artificial drainage. Examples are the Shelmadine and Holly soils, which collectively comprise approximately 7,000 acres in the county. The somewhat poorly drained soils, such as Evendale and Alvira soils, are so wet that crop damage results during most years unless artificial drainage is applied. These soils cover about 4,700 acres.

Small, wet areas are in some drainageways and swales, generally within the areas of moderately well drained Watson and Washington soils. Applying artificial drainage to these areas generally is not practical.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage usually is needed for those poorly drained soils that are intensively farmed. Drains must be more closely spaced in those soils with slow permeability than in others that are more permeable. In addition, finding adequate outlets for tile drainage systems is often difficult.

Fertility and available phosphorus and magnesium levels are naturally low in many soils in the survey area. Many upland soils have high levels of acidity. The acid soils, for example, require lime to supply calcium and to raise the pH level sufficiently for alfalfa and other crops.

Many soils used for crops in the survey area have relatively low levels of organic matter. Generally, the structure of the surface layer of such soils is weak, and intensive rainfall usually results in crusting of the surface. The crust usually is hard and nearly impervious to water when the soil is dry and usually reduces infiltration and increases runoff. Regular additions of crop residue, manure, and other organic material help to improve soil structure and reduce crust formation.

Generally, fall plowing is not considered to be a good practice on soils with a surface layer of silt loam that are low in organic matter content. Fall plowing commonly results in the formation of a crust during the winter and spring, and many soils are nearly as dense and hard at planting time after fall plowing as they were before they were plowed. In addition, sloping soils are subject to accelerated erosion if they are plowed in the fall.

Special crops produced in the survey area are apples, vegetables, and nursery plants. Soils that are deep, that have good natural drainage, and that warm early in spring are best suited to special crops, such as the tree fruits. Good air drainage is needed to reduce frost damage to apples and peaches. Elliber, Hartleton, and Bedington soils generally have the best soil properties for tree fruits.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*4*). Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and

narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed soil map units."

Woodland Management and Productivity

Paxton G. Wolfe, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

Union County has about 106,900 acres of woodland (*5*), about half of which is publicly owned. The main area of public woodland is in the Bald Eagle State Forest, which covers 29 percent of the land area in the county. Stands of second- and third-growth trees make up the woodland in the county. The principal forest types and the extent of each, as given by the Forest Service, are as follows:

Oak-hickory makes up 86 percent of the total woodland in the county. This cover type consists mainly of white oak, red oak, and hickories, although black oak and chestnut oak are dominant in some areas. The principal associates are yellow-poplar, shagbark hickory, white ash, red maple, and beech.

Maple-beech-birch makes up 6 percent of the woodland. Sugar maple, beech, and yellow birch are the component species in this cover type. Associated species are varying admixtures of basswood, red maple, hemlock, red oak, white ash, eastern white pine, black birch, black cherry, yellow-poplar, and cucumbertree.

Elm-ash-red maple makes up 3 percent of the total woodland. This cover type is dominantly white ash, American elm, and red maple. The associates are slippery elm, yellow birch, sycamore, and hemlock.

Chestnut oak is on 2 percent of the woodland. Chestnut oak grows in pure stands or is predominant. The common associates are red oak, white oak, black oak, scarlet oak, pitch pine, blackgum, and red maple.

Eastern white pine makes up 2 percent of the woodland in the county. Eastern white pine is pure or predominant. The principal associates are Virginia and pitch pine, ash, sugar and red maple, hemlock, red and white oak, quaking and bigtooth aspen, and gray, yellow, and black birch.

Virginia pine-pitch pine completes the primary forest cover types with 1 percent of the total woodland in Union County. Virginia pine and pitch pine are dominant. The principal associates are red oak, black oak, scarlet oak, chestnut oak, and hickories.

Sawtimber makes up approximately 47 percent of the acreage in commercial woodland, poletimber 46 percent, and seedlings and saplings 7 percent.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates

that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, c, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor for wood crop production. They are the most important tree species in regard to growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The areas of woodland, adjoining farmland, streams, and the Susquehanna River provide the major sources of recreational activities in the county, including hunting, fishing, camping, hiking, boating, and nature study. While most of the woodland and the land through which the streams flow is privately owned, a part of the acreage is publicly owned or controlled. The Pennsylvania Game Commission, for example, manages State Game Lands 252, 201, and 193 for public hunting. The Bureau of Forestry manages 62,000 acres of land.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Richard D. Heaslip, biologist, Soil Conservation Service, helped to prepare this section.

The principal species of game in Union County are white-tailed deer, black bear, gray squirrel, cottontail rabbit, ruffed grouse, ring-necked pheasant, doves, and wild turkey. The more abundant fur bearers are muskrat, raccoon, and fox. There is also a large variety of song birds, reptiles, amphibians, and small mammals.

The distribution of wildlife species in the county is related to land use and can be identified by the soil associations on the general soil map. White-tailed deer, for instance, are throughout the Laidig-Buchanan-Meckesville and Dekalb-Ungers-Hazleton associations. Ruffed grouse inhabit these same soil associations in timbered areas and along edges of fields near the borders of the Weikert-Berks-Hartleton association.

Ring-necked pheasants, doves, and cottontail rabbits are plentiful in areas that are or were farmed; these areas are in the Hagerstown-Elliber-Washington and Edom associations.

Gray squirrel and turkey prefer the mature wooded areas of the Laidig-Buchanan-Meckesville and Dekalb-Ungers-Hazleton associations. The oak and hickory trees provide a plentiful supply of food for these species.

Black bear prefer the more isolated woodlands and abundant water supply of the northwestern part of the county, in the Dekalb-Ungers-Hazleton association. Raccoon and fox inhabit all areas of the county, and muskrat live along the streams and ponds.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild

herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

Engineering

John J. Mank, conservation engineer, Soil Conservation Service, helped to prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath

the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the

water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium.

A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture (*3*). These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in table 16 are assigned to two hydrologic soil groups. Dual grouping is used for one of two reasons: (1) Some soils have a seasonal high water table but can be drained. In this instance the first letter applies to the drained condition of the soil and the second letter to the undrained condition. (2) In some soils that are less than 20 inches deep to bedrock, the first letter applies to areas where the bedrock is cracked or pervious and the second letter to areas where bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface area of the soil.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high

the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*6*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that have a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is loamy-skeletal, mixed, mesic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*6*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

This soil survey is part of a four-county survey that encompasses Montour, Northumberland, Snyder, and Union Counties. Thus, a typical pedon described in this section may be in Union County or in one of the other three counties.

The map units of each soil series are described in the section "Detailed soil map units."

Albrights series

Soils of the Albrights series are fine-loamy, mixed, mesic Aquic Fragiudalfs. They are deep, moderately well drained and somewhat poorly drained soils on ridges and in drainageways. The soils formed in colluvium or glacial till derived from red shale. Slopes range from 3 to 8 percent.

Albrights soils are near well drained Meckesville and Leck Kill soils and poorly drained Shelmadine soils.

Typical pedon of Albrights silt loam, 3 to 8 percent slopes, Union County, West Buffalo Township, 150 feet northeast of the junction of Routes T386 and T371:

Ap—0 to 10 inches, dark reddish gray (5YR 4/2) silt loam; moderate fine granular structure; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; neutral; clear smooth boundary.

A12—10 to 15 inches, dark reddish gray (5YR 4/2) silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; neutral; clear smooth boundary.

B21t—15 to 19 inches, reddish brown (5YR 4/3) clay loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; thin patchy clay films on ped faces; 5 percent coarse fragments; medium acid; gradual smooth boundary.

B22t—19 to 30 inches, reddish brown (5YR 5/3) clay loam; common medium distinct pinkish gray (7.5YR 6/2) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky, plastic; thin patchy clay films on ped faces; 5 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx1—30 to 48 inches, reddish brown (5YR 4/4) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; very firm, brittle, slightly sticky, slightly plastic; 10 percent coarse fragments; light gray (10YR 7/1) coatings on prism faces; very strongly acid; gradual wavy boundary.

Bx2—48 to 60 inches, dark reddish gray (5YR 4/2) silt loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate very coarse prismatic structure; very firm, brittle, slightly sticky, slightly plastic; 10 percent coarse fragments; gray (N 6/0) coatings on prism faces; very strongly acid.

The solum thickness ranges from 40 to 70 inches. The depth to bedrock is more than 60 inches. The depth to the Bx horizon ranges from 18 to 32 inches. The coarse fragment content ranges from 5 to 15 percent above the Bx horizon and from 10 to 30 percent in the Bx horizon. In unlimed areas reaction ranges from extremely acid through strongly acid in the upper part of the solum and from very strongly acid through slightly acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is silt loam, clay loam, loam, or silty clay loam.

The Bx horizon has hue of 10R through 5YR, value of 4 or 5, and chroma of 2 through 6. The fine-earth fraction is silt loam, loam, clay loam, or silty clay loam.

Some pedons have a C horizon with hue of 10R through 5YR, value of 4 or 5, and chroma of 3 through 6. The fine-earth fraction is silt loam, clay loam, loam, or silty clay loam.

Allenwood series

Soils of the Allenwood series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on hills. They formed in pre-Wisconsin glacial till derived from sandstone, siltstone, and shale. Slopes range from 0 to 15 percent.

Allenwood soils are near moderately well drained Watson soils, somewhat poorly drained Alvira soils, poorly drained Shelmadine soils, and well drained Hartleton soils. The content of coarse fragments is less in the Allenwood soils than in the Hartleton soils.

Typical pedon of Allenwood gravelly silt loam, 0 to 3 percent slopes, Snyder County, Beaver Township, about 0.7 mile east of the junction of Route PA 235 and Route 54023, 100 feet south of Route 54023:

Ap—0 to 11 inches, dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable, nonsticky, slightly plastic; 15 percent coarse fragments; slightly acid; abrupt smooth boundary.

B1—11 to 18 inches, strong brown (7.5YR 5/6) gravelly silty clay loam; moderate coarse subangular blocky structure parting to moderate fine and medium subangular blocky; friable, slightly sticky, plastic; 15 percent coarse fragments; slightly acid; clear wavy boundary.

B21t—18 to 35 inches, yellowish red (5YR 5/6) gravelly silty clay loam; moderate coarse subangular blocky structure parting to moderate fine and medium subangular blocky; firm, slightly sticky, plastic; thin patchy clay films on ped faces; 15 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—35 to 56 inches, red (2.5YR 4/6) gravelly silty clay loam; moderate coarse subangular blocky structure; firm, slightly sticky, plastic; thin patchy clay films on ped faces and in pores; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B3—56 to 68 inches, red (2.5YR 4/6) gravelly silty clay loam; streaks of light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/4); weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy clay films on ped faces and in pores; 35 percent coarse fragments; very strongly acid; clear wavy boundary.

C—68 to 89 inches, red (2.5YR 4/6) very gravelly silt loam; streaks of light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/4); massive; firm, nonsticky, slightly plastic; thin patchy clay films on coarse fragments and pressure faces; many black coatings; 70 percent coarse fragments; very strongly acid.

The solum thickness ranges from 45 to 75 inches. The depth to bedrock is greater than 60 inches. The coarse fragment content is 15 to 25 percent in the Ap and B1 horizons, 15 to 40 percent in the Bt horizon, and 20 to 80 percent in the B3 and C horizons. In unlimed areas the soil is strongly acid through extremely acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The B1 and B3 horizons have hue of 2.5YR through 7.5YR, value of 4 or 5, and chroma of 4 or 6. The fine-earth fraction is silt loam or silty clay loam. The B2t horizon has hue of 2.5YR or 5YR, value of 4 through 6, and chroma of 6 or 8. The fine-earth fraction mainly is silty clay loam, clay loam, or silt loam but includes clay and silty clay.

The C horizon has hue of 2.5YR or 5YR, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction is silt loam, clay loam, loam, or silty clay loam. The C horizon in some pedons is variegated and has black stains and mottles.

Alvira series

Soils of the Alvira series are fine-loamy, mixed, mesic Aeric Fragiaquults. They are deep, somewhat poorly drained soils on flat to slightly concave, dissected hills. They formed in pre-Wisconsin glacial till derived from sandstone, shale, and siltstone. Slopes range from 0 to 15 percent.

Alvira soils are near poorly drained Shelmadine soils; moderately well drained Watson soils; well drained Allenwood soils; and moderately deep, well drained Berks soils.

Typical pedon of Alvira silt loam, 0 to 3 percent slopes, Snyder County, West Beaver Township, 100 feet south of Route T536, 1.2 miles west of the junction of Routes T536 and 54034:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

B1—9 to 12 inches, brown (10YR 5/3) silt loam; common fine distinct dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B2t—12 to 20 inches, grayish brown (10YR 5/2) silt loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky, plastic; thin continuous clay films on ped faces; 10 percent coarse fragments; slightly acid; clear wavy boundary.

Bx1—20 to 43 inches, strong brown (7.5YR 5/6) gravelly silty clay loam; weak coarse prismatic structure; firm, brittle, sticky, plastic; moderately thick continuous clay films on prism faces; 15 percent coarse fragments; gray (N 6/0) coatings on prism faces; strongly acid; gradual wavy boundary.

Bx2—43 to 62 inches, strong brown (7.5YR 5/6) gravelly silt loam; weak very coarse prismatic structure; firm, brittle, slightly sticky, slightly plastic; 20 percent coarse fragments; gray (N 6/0) coatings on prism faces; strongly acid.

The solum thickness ranges from 40 to 80 inches. The depth to bedrock is greater than 60 inches. The depth to the Bx horizon ranges from 16 to 28 inches. Coarse fragments make up 5 to 25 percent of horizons above the Bx horizon and 10 to 40 percent of the Bx and C horizons. In unlimed areas the soil ranges from strongly acid through extremely acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4.

The B1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam or silty clay loam in the fine-earth fraction.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 through 7, and chroma of 1 through 6. It is mottled. The fine-earth fraction is silt loam or silty clay loam.

The Bx horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 2 through 6. Prism faces are gray (N 6/0, 7/0), and mottles are gray through strong brown. The fine-earth texture is loam, silt loam, silty clay loam, or clay loam.

Some pedons have a C horizon with hue of 5YR through 10YR, value of 4 or 5, and chroma of 1 through 6. The fine-earth fraction is loam, silty clay loam, silt loam, or clay loam.

Barbour series

Soils of the Barbour series are coarse-loamy over sand or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts. They are deep and well drained and are on flood plains. The soils formed in alluvial material derived from acid sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Barbour soils are near well drained Linden soils, moderately well drained and somewhat poorly drained Basher soils, and poorly drained and very poorly drained Holly soils. Barbour soils have a IIC horizon above a depth of 40 inches, and Linden soils do not have a IIC horizon.

Typical pedon of Barbour fine sandy loam, in an area of Barbour-Linden complex, rarely flooded, Northumberland County, Delaware Township, 1 mile north of Interstate Route 80, 165 feet east of Route PA 405:

Ap—0 to 9 inches, dark reddish brown (5YR 3/3) fine sandy loam; moderate fine granular structure; friable, nonsticky, nonplastic; neutral; abrupt wavy boundary.
B2—9 to 33 inches, yellowish red (5YR 4/6) silt loam; moderate fine subangular blocky structure; friable, slightly sticky, plastic; neutral; abrupt wavy boundary.
IIC1—33 to 47 inches, dark reddish brown (2.5YR 3/4) loamy sand; weak fine subangular blocky structure; friable, nonsticky, nonplastic; strongly acid; gradual wavy boundary.
IIC—47 to 56 inches, reddish brown (5YR 4/4) sandy loam; moderate medium granular structure; very friable, nonsticky, slightly plastic; strongly acid; abrupt wavy boundary.
IIIC3—56 to 66 inches, brown (7.5YR 5/4) sand; single grain; loose, nonsticky, nonplastic; strongly acid.

The solum thickness and the depth to the IIC horizon are 20 to 40 inches, and bedrock is at a depth of more than 60 inches. The coarse fragment content ranges from 0 to 15 percent in the solum and from 0 to 60 percent in the substratum. In unlimed areas the soils are strongly acid or very strongly acid throughout.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is loam, silt loam, or fine sandy loam.

The B horizon has hue of 2.5YR through 7.5YR, value of 3 or 4, and chroma of 4 or 6. The fine-earth fraction is loam, silt loam, or sandy loam.

The C horizon has hue of 2.5YR through 7.5YR, value of 3 through 5, and chroma of 2 through 8. It ranges from sandy loam to stratified sand and gravel.

Basher series

Soils of the Basher series are coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. They are deep and moderately well drained and somewhat poorly drained and are on flood plains. The soils formed in alluvial material derived from acid sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Basher soils are on the landscape near well drained Barbour and Linden soils and poorly drained and very poorly drained Holly soils.

Typical pedon of Basher silt loam, in an area of Basher soils, frequently flooded, Snyder County, Penn Township, 40 feet west of Wolf Run bridge on Route T486, 0.2 mile south of Route PA 204:

Ap—0 to 5 inches, dark reddish brown (5YR 3/3) silt loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; neutral; gradual wavy boundary.
B21—5 to 15 inches, dark reddish brown (5YR 3/4) silt loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; slightly acid; gradual wavy boundary.
B22—15 to 24 inches, reddish brown (5YR 4/4) silt loam; many coarse distinct weak red (2.5YR 4/2) mottles; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; medium acid; clear wavy boundary.
C1—24 to 38 inches, reddish brown (5YR 4/3) silt loam; common fine faint yellowish red (5YR 4/6) mottles; massive; firm in place, very friable disturbed; slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.
C2—38 to 56 inches, reddish gray (5YR 5/2) loam; many medium prominent strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) mottles; massive; firm in place, very friable disturbed; slightly sticky, slightly plastic; medium acid; gradual wavy boundary.
IIC3—56 to 65 inches, stratified sand and gravel.

The solum thickness ranges from 16 to 40 inches. The depth to bedrock is greater than 60 inches. The coarse fragment content ranges from 0 to 10 percent in the solum and from 0 to 60 percent in the C horizon. In unlimed areas the reaction is medium acid to very strongly acid throughout.

The Ap horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. It is loam, silt loam, or fine sandy loam.

The B horizon has hue of 5YR or 7.5YR, value of 3 through 5, and chroma of 3 through 6. It is loam, silt loam, or fine sandy loam.

The C horizon has hue of 5YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. The fine-earth fraction is loam, silt loam, and sandy loam.

The IIC horizon generally is at a depth of more than 40 inches. In some pedons there is no IIC horizon. The fine-earth fraction of the IIC horizon is loamy sand or sand.

Bedington series

Soils of the Bedington series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on ridges. The soils formed in material derived from acid shale, siltstone, and sandstone. Slopes range from 3 to 25 percent.

Bedington soils are near deep, well drained Hartleton soils; moderately deep, well drained Berks soils; and shallow, well drained Weikert soils. The solum in the Bedington soils is more than 40 inches thick, and the solum in the Hartleton soils is less than 40 inches thick.

Typical pedon of Bedington silt loam, 3 to 8 percent slopes, Northumberland County, Delaware Township, 1.75 miles northeast of Watsontown on Route 49098, 150 feet southeast of electric pole number 158:

Ap—0 to 10 inches, dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable,

nonsticky, slightly plastic; 5 percent coarse fragments; medium acid; abrupt smooth boundary.
B1—10 to 14 inches, yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 10 percent coarse fragments; strongly acid; clear wavy boundary.
B21t—14 to 24 inches, yellowish brown (10YR 5/6) shaly clay loam; moderate medium subangular structure; friable, sticky, plastic; thin patchy clay films on ped faces; 15 percent coarse fragments; very strongly acid; gradual wavy boundary.
B22t—24 to 34 inches, yellowish brown (10YR 5/6) silty clay loam; moderate medium and coarse subangular blocky structure; firm, sticky, plastic; thin continuous clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
B23t—34 to 42 inches, yellowish brown (10YR 5/6) shaly silty clay loam; moderate coarse blocky structure; very firm, sticky, very plastic; thin continuous clay films on ped faces; many black coatings; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.
B24t—42 to 47 inches, yellowish brown (10YR 5/6) shaly silty clay loam; weak coarse subangular blocky structure; firm, slightly sticky, plastic; thin patchy clay films on ped faces; 25 percent coarse fragments; strongly acid; gradual wavy boundary.
C—47 to 54 inches, yellowish brown (10YR 5/4) very shaly clay loam; massive; friable, slightly sticky, slightly plastic; 60 percent coarse fragments; strongly acid; gradual wavy boundary.
R—54 inches, thin-bedded olive (5Y 5/4) shale bedrock.

The solum thickness is 40 to 70 inches. The depth to bedrock is at least 48 inches. The content of coarse fragments ranges from 0 to 15 percent in the Ap horizon, 5 to 25 percent in the upper part of the B horizon, 20 to 50 percent in the lower part of the B horizon, and 30 to 80 percent in the C horizon. In unlimed areas the soil is very strongly acid to slightly acid in the upper part of the solum and very strongly acid or strongly acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction is silt loam, silty clay loam, clay loam, or loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. The fine-earth fraction is loam, clay loam, silt loam, or silty clay loam.

Berks series

Soils of the Berks series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. These moderately deep, well drained soils are on ridges, benches, and hillsides. The soils formed in material weathered from acid shale, siltstone, and sandstone. Slopes range from 3 to 25 percent.

Berks soils are near shallow, well drained Weikert soils; deep, well drained Bedington and Hartleton soils; and deep, moderately well drained Watson soils.

Typical pedon of Berks shaly silt loam, 8 to 15 percent slopes, Northumberland County, Upper Mahanoy Township, 200 feet east of the junction of Routes T478 and T345, 85 feet north of T345, in a cultivated field:

Ap—0 to 11 inches, dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; very friable, nonsticky, nonplastic; 30 percent coarse fragments; slightly acid; abrupt smooth boundary.
B2—11 to 24 inches, brownish yellow (10YR 6/6) very shaly silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 50 percent coarse fragments; strongly acid; gradual wavy boundary.
C—24 to 30 inches, brownish yellow (10YR 6/6) very shaly silt loam; massive; friable, slightly sticky, nonplastic; 70 percent coarse fragments; strongly acid; gradual wavy boundary.
R—30 inches, gray (10YR 6/1) and olive (5Y 5/3) shale bedrock.

The solum thickness ranges from 18 to 40 inches. The depth to bedrock is 20 to 40 inches. The coarse fragment content is 15 to 50 percent in the Ap horizon, 25 to 75 percent in the B horizon, and 60 to 80 percent in the C horizon. In unlimed areas the soil ranges from medium acid through very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. The fine-earth fraction is silt loam or loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 6. The fine-earth fraction is silt loam or loam.

Buchanan series

Soils of the Buchanan series are fine-loamy, mixed, mesic Aquic Fragiudults. They are deep, moderately well drained soils on foot slopes of mountains. The soils formed in colluvium from acid sandstone and shale. Slopes range from 0 to 25 percent.

Buchanan soils are near deep, well drained Laidig soils; deep, poorly drained Shelmadine soils; deep, well drained Hazleton soils; and moderately deep, well drained Dekalb soils.

Typical pedon of Buchanan gravelly loam, in an area of Buchanan very stony loam, 0 to 8 percent slopes, Union County, White Deer Township, 1.75 miles west of Spruce Run Reservoir on Spruce Run Road, 500 feet

north of road along logging road, 125 feet west of the logging road:

A1—0 to 2 inches, very dark gray (10YR 3/1) gravelly loam; weak medium granular structure; very friable, nonsticky, nonplastic; 15 percent coarse fragments; extremely acid; abrupt smooth boundary.
B21—2 to 10 inches, light yellowish brown (10YR 6/4) gravelly loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; 15 percent coarse fragments; very strongly acid; clear wavy boundary.
B22t—10 to 15 inches, yellowish brown (10YR 5/4) gravelly silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films in pores; 15 percent coarse fragments; very strongly acid; gradual wavy boundary.
B23t—15 to 20 inches, yellowish brown (10YR 5/4) gravelly silt loam; common medium distinct reddish yellow (7.5YR 6/8) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films in pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.
Bx1—20 to 29 inches, strong brown (7.5YR 5/6) gravelly loam; common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; very firm, brittle, slightly sticky, nonplastic; thin patchy clay films on prism faces; 25 percent coarse fragments; strongly acid; gradual wavy boundary.
Bx2—29 to 60 inches, strong brown (7.5YR 5/6) gravelly loam; many coarse distinct pale brown (10YR 6/3) mottles and common medium distinct yellowish red (5YR 4/6) mottles; weak coarse prismatic structure parting to weak thick platy; very firm, brittle, slightly sticky, nonplastic; thin patchy clay films on prism faces; 25 percent coarse fragments; strongly acid.

The solum thickness ranges from 40 to 70 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan ranges from 20 to 36 inches. The coarse fragment content ranges from 5 to 30 percent in individual horizons above the Bx horizon and from 15 to 50 percent in the Bx and C horizons. In unlimed areas the soil is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 through 6. The Bx horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 3 through 6. The fine-earth fraction of the B2t and Bx horizons is silt loam, loam, sandy clay loam, or clay loam.

Some pedons have a C horizon that has hue of 10YR through 5YR, value of 5 or 6, and chroma of 1 through 6. The fine-earth fraction is silt loam, loam, sandy clay loam, or clay loam.

The Buchanan soils in this survey area are a taxadjunct to the Buchanan series because they do not have low-chroma mottles in the upper 10 inches of the argillic horizon or within 16 inches of the surface. This difference does not significantly affect the use and management of the soils.

Calvin series

Soils of the Calvin series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are moderately deep, well drained soils on knobs and ridges. The soils formed in material weathered from acid red shale, siltstone, and sandstone. Slopes range from 3 to 25 percent.

Calvin soils are near deep, moderately well drained and somewhat poorly drained Albrights soils; shallow, well drained Klinesville soils; and deep, well drained Leck Kill and Meckesville soils.

Typical pedon of Calvin shaly silt loam, in an area of Calvin-Klinesville shaly silt loams, 8 to 15 percent slopes, Northumberland County, Upper Mahanoy Township, 100 feet west of intersection of Routes 49010 and T492, 1/4 mile west of the Schuykill County line:

Ap—0 to 8 inches, dark reddish brown (5YR 3/3) shaly silt loam; weak granular structure; very friable, nonsticky, nonplastic; 25 percent coarse fragments; medium acid; abrupt smooth boundary.
B2—8 to 25 inches, reddish brown (2.5YR 4/4) very shaly silt loam; weak coarse subangular blocky structure; friable, slightly sticky, nonplastic; 50 percent coarse fragments; medium acid; gradual wavy boundary.
C—25 to 32 inches, reddish brown (2.5YR 4/4) very shaly silt loam; single grain; loose, slightly sticky, nonplastic; 70 percent coarse fragments; medium acid; gradual wavy boundary.
R—32 inches, dusky red (10R 3/4) shale bedrock.

The solum thickness ranges from 20 to 35 inches. The depth to bedrock is 20 to 40 inches. The coarse fragment content ranges from 15 to 25 percent in the A horizon, 25 to 55 percent in the B horizon, and 40 to 80 percent in the C horizon. In unlimed areas the soil ranges from medium acid through very strongly acid throughout.

The Ap horizon has hue of 5YR or 7.5YR and value and chroma of 2 through 4.

The B horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 3 through 6. The fine-earth fraction is silt loam, loam, or light silty clay loam.

The C horizon has hue of 10R or 2.5YR, value of 3 or 4, and chroma of 2 through 4. The fine-earth fraction is silt loam or loam.

Clymer series

Soils of Clymer series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on hills and mountains. The soils formed in residuum from sandstone and shale. Slopes range from 0 to 80 percent.

Clymer soils are near deep, well drained Hazleton and Laidig soils and moderately deep, well drained Dekalb soils. The content of coarse fragments in the subsoil is lower in the Clymer soils than in the Hazleton soils. The Clymer soils do not have the fragipan typical of the Laidig soils.

Typical pedon of Clymer gravelly sandy loam, in an area of Hazleton and Clymer extremely stony sandy loams, 25 to 80 percent slopes, Northumberland County, Zerbe Township, 1.5 miles south of Trevorton, 0.3 mile east of Route PA 890:

A1—0 to 1 inch, very dark brown (10YR 2/2) gravelly sandy loam; weak fine granular structure; very friable; nonsticky, nonplastic; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

A2—1 to 3 inches, yellowish brown (10YR 5/6) gravelly sandy loam; weak very fine granular structure; very friable, nonsticky, nonplastic; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B21—3 to 14 inches, brownish yellow (10YR 6/6) gravelly sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—14 to 30 inches, brownish yellow (10YR 6/6) gravelly loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films on ped faces; 25 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—30 to 66 inches, reddish yellow (7.5YR 6/6) gravelly sandy loam; massive; very friable, nonsticky, nonplastic; 40 percent coarse fragments; very strongly acid.

The solum thickness ranges from 24 to 40 inches. The depth to bedrock is more than 40 inches. The coarse fragment content ranges from 10 to 40 percent in the solum and from 20 to 80 percent in the C horizon. In unlimed areas the soil is strongly acid through extremely acid throughout.

The A1 horizon has hue of 10YR, value of 2, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction is sandy loam in the B21 horizon and loam, sandy loam, or sandy clay loam in the B22t horizon.

The C horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 or 6. The fine-earth fraction is sandy loam or loam.

Dekalb series

Soils of the Dekalb series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are moderately deep, well drained soils on mountains. The soils formed in material weathered from acid gray and brown sandstone. Slopes range from 0 to 90 percent.

Dekalb soils are near deep, well drained Hazleton, Ungers, and Laidig soils and deep, moderately well drained Buchanan soils.

Typical pedon of Dekalb channery sandy loam, in an area of Dekalb extremely stony sandy loam, steep, Upper Mahanoy Township, Northumberland County, south slope of Line Mountain, 2 miles northeast of Leck Kill, 200 yards west of the intersection of Routes 49077 and 125:

O1—3 inches to 1 inch, leaf litter.

O2—1 inch to 0, black (10YR 2/1) largely decomposed organic matter.

A1—0 to 2 inches, very dark grayish brown (10YR 3/2) channery sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; 40 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—2 to 8 inches, yellowish brown (10YR 5/4) channery sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; 45 percent coarse fragments; strongly acid; gradual wavy boundary.

B21—8 to 15 inches, yellowish brown (10YR 5/6) channery sandy loam; weak medium and fine subangular blocky structure; very friable, nonsticky, nonplastic; 45 percent coarse fragments; strongly acid; gradual wavy boundary.

B22—15 to 22 inches, yellowish brown (10YR 5/6) very channery sandy loam; weak medium and fine subangular blocky structure; very friable, nonsticky, nonplastic; 60 percent coarse fragments; strongly acid; gradual wavy boundary.

C—22 to 33 inches, yellowish brown (10YR 5/4) very channery sandy loam; massive; very friable, nonsticky, nonplastic; 75 percent coarse fragments; strongly acid; abrupt wavy boundary.

R—33 inches, gray (10YR 6/1) sandstone bedrock.

The solum thickness and depth to bedrock range from 20 to 40 inches. The coarse fragment content ranges from 20 to 60 percent in the solum and from 50 to 90 percent in the C horizon. In unlimed areas the soil ranges from extremely acid through strongly acid throughout.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction is sandy loam or loam.

The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. The fine-earth fraction is sandy loam or loamy sand.

Dystrochrepts

Dystrochrepts consist of deep to shallow, well drained and somewhat excessively drained soils. They formed in material derived from sandstone and shale. The soils are on mountaintops and mountainsides. Boulders and stones cover 50 to 90 percent of the surface. Slopes range from 0 to 120 percent.

Dystrochrepts commonly are near Hazleton, Dekalb, Laidig, Clymer, and Meckesville soils but do not have the distinct horizons typical of those soils.

Because of the variability of Dystrochrepts, a typical pedon is not given. The solum ranges from 10 to more than 60 inches thick. The depth to bedrock ranges from 10 to 60 inches or more. Coarse fragments make up 15 to 70 percent of individual horizons. The soils are extremely acid through strongly acid throughout.

The A horizon is dark brown (10YR 4/3) to very dark gray (10YR 3/1). The fine-earth fraction is silt loam, sandy loam, or loam.

The B horizon is dark brown (10YR 4/3) to yellowish brown (10YR 5/6). The fine-earth fraction is sandy loam, silt loam, or loam.

The C horizon has a wide range of color. The fine-earth fraction is sandy loam, loam, or silt loam.

Edom series

Soils of Edom series are fine, illitic, mesic Typic Hapludalfs. They are deep and well drained and are on upland ridges. The soils formed in material weathered from interbedded calcareous shale and thin-bedded limestone. Slopes range from 3 to 25 percent.

Edom soils are near deep, well drained Hagerstown soils; deep, moderately well drained Washington soils; and shallow, well drained Opequon soils. Edom soils have a thinner solum than the Hagerstown soils.

Typical pedon of Edom shaly silt loam, in an area of Edom complex, 3 to 8 percent slopes, in a cultivated field, Union County, Buffalo Township, 1 mile south of Route PA 45 on Route 59014, 1/4 mile east on Route T439, 400 feet south of road:

Ap—0 to 9 inches, dark brown (10YR 4/3) shaly silt loam; moderate fine and medium granular structure; very friable, slightly sticky, slightly plastic; 25 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21t—9 to 15 inches, brownish yellow (10YR 6/6) shaly silty clay loam; moderate medium subangular blocky structure; friable, sticky, plastic; moderately thick continuous clay films in pores and on coarse fragments, few on ped faces; 25 percent coarse fragments; slightly acid; clear wavy boundary.

B22t—15 to 24 inches, yellowish brown (10YR 5/6) shaly silty clay loam; moderate medium subangular blocky structure; friable; sticky, plastic; moderately thick continuous clay films in pores and on coarse fragments, patchy on ped faces; 25 percent coarse fragments; slightly acid; clear wavy boundary.

B23t—24 to 33 inches, yellowish brown (10YR 5/6) shaly silty clay loam; weak medium subangular blocky structure; friable, sticky, plastic; thick continuous clay films in pores, on coarse fragments, and on ped faces; 30 percent coarse fragments; slightly acid; clear wavy boundary.

B3—33 to 39 inches, yellowish brown (10YR 5/4) shaly clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thick patchy clay films in pores and on coarse fragments; 30 percent coarse fragments; slightly acid; gradual wavy boundary.

C1—39 to 56 inches, yellowish brown (10YR 5/4) very shaly silty clay loam; massive; very friable, slightly sticky, slightly plastic; thick patchy clay films in pores and on coarse fragments; 60 percent coarse fragments; neutral; gradual irregular boundary.

C2—56 to 75 inches, yellowish brown (10YR 5/4) very shaly silty clay loam; massive, very friable, sticky, plastic; thick patchy clay films in pores and on coarse fragments; 60 percent coarse fragments; mildly alkaline; gradual irregular boundary.

R—75 inches, yellowish brown (10YR 5/4) calcareous shale bedrock.

The solum thickness ranges from 20 to 40 inches. The depth to bedrock is more than 40 inches. Coarse fragments make up 15 to 30 percent of the solum and 20 to 90 percent of the C horizon. In unlimed areas the soil ranges from medium acid to neutral in the upper part of the solum and from slightly acid to mildly alkaline in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 2.5Y or 10YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction mainly is clay or silty clay loam and is more than 35 percent clay; some subhorizons are clay loam.

The C horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction is silty clay loam, silty clay, or clay.

Elliber series

Soils of the Elliber series are loamy-skeletal, mixed, mesic Typic Hapludults. They are deep, well drained soils on side slopes and ridges. The soils formed in materials weathered from cherty limestone. Slopes range from 3 to 70 percent.

Elliber soils are near deep, moderately well drained Kreamer and Washington, wet substratum, soils and somewhat poorly drained Evendale soils.

Typical pedon of Elliber very cherty silt loam, 8 to 15 percent slopes, Snyder County, West Perry Township, 2.25 miles west of Mount Pleasant Mills, 300 feet north of Route PA 35:

Ap—0 to 6 inches, grayish brown (10YR 5/2) very cherty silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; 60 percent coarse fragments; slightly acid; abrupt wavy boundary.

B1—6 to 15 inches, light yellowish brown (10YR 6/4) very cherty silt loam; weak fine subangular blocky structure; friable, slightly sticky, nonplastic; 60 percent coarse fragments; medium acid; clear wavy boundary.

B21t—15 to 35 inches, strong brown (7.5YR 5/6) very cherty loam; weak fine subangular blocky structure; firm, slightly sticky, nonplastic; thin patchy clay films on ped faces; 60 percent coarse fragments; medium acid; clear wavy boundary.

B22t—35 to 57 inches, yellowish brown (10YR 5/8) very cherty silt loam; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; thin patchy clay films on ped faces; few black coatings; 70 percent coarse fragments; strongly acid; clear wavy boundary.

C—57 to 74 inches, brown (7.5YR 5/4) very cherty silt loam; few medium distinct light gray (N 2/0) mottles; weak very coarse prismatic structure; firm, slightly sticky, slightly plastic; 60 percent coarse fragments; strongly acid.

The solum thickness ranges from 40 to 70 inches, and the depth to bedrock is more than 60 inches. The coarse fragment content is 40 to 75 percent throughout the soil. In unlimed areas the soil is strongly acid through extremely acid throughout.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 through 8. The fine-earth fraction is loam, silt loam, silty clay loam, or clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction is loam, silt loam, or clay loam.

Evendale series

Soils of the Evendale series are clayey, mixed, mesic Aeric Ochraquults. They are deep, somewhat poorly drained soils on toe slopes of cherty limestone ridges. The soils formed in colluvial material derived from cherty limestone and are generally underlain by shale bedrock. Slopes range from 3 to 8 percent.

Evendale soils are near deep, well drained Elliber soils and deep, moderately well drained Kreamer soils.

Typical pedon of Evendale cherty silt loam, 3 to 8 percent slopes, Snyder County, Spring Township, 200 feet east of Route T568, 1,000 feet north of Route 54024:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) cherty silt loam, light gray (10YR 7/2) dry; weak fine and medium granular structure; friable, nonsticky, slightly plastic; 15 percent coarse fragments; medium acid; abrupt smooth boundary.

B21t—8 to 15 inches, yellowish brown (10YR 5/6) silty clay loam; many medium distinct light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, plastic; thin patchy clay films on ped faces; 10 percent coarse fragments; medium acid; clear wavy boundary.

B22t—15 to 23 inches, yellowish brown (10YR 5/6) cherty silty clay loam; common fine distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm, slightly sticky, plastic; thin continuous clay films on ped faces and in pores; 15 percent coarse fragments; light gray (10YR 7/1) coatings on peds; strongly acid; gradual wavy boundary.

B23t—23 to 35 inches, yellowish brown (10YR 5/6) cherty silty clay; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm, slightly sticky, plastic; thin continuous clay films on ped faces and in pores; few black coatings on peds; 15 percent coarse fragments; light gray (10YR 7/1) coatings on peds; very strongly acid; clear wavy boundary.

B24t—35 to 41 inches, brown (7.5YR 4/4) cherty silty clay loam; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm, slightly sticky, plastic; thin continuous clay films on ped faces and in pores; 25 percent coarse fragments; light gray (N 7/0) coating on faces of prisms; very strongly acid; clear wavy boundary.

B25t—41 to 51 inches, strong brown (7.5YR 5/6) cherty clay; fine prominent light gray (N 7/0) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm, sticky, plastic; thin patchy clay films on ped faces and in pores; 45 percent coarse fragments; gray (5Y 5/1) coatings on faces of prisms; very strongly acid; abrupt wavy boundary.

IIB3—51 to 64 inches, dark reddish brown (5YR 3/3) shaly clay loam; weak very coarse prismatic structure; firm, slightly sticky, plastic; thin patchy clay films in pores; 40 percent shale fragments; gray (5YR 5/1) coatings on faces of prisms; very strongly acid.

IIR—64 inches, thin-bedded black (5YR 2/1) and gray (5Y 5/1) shale bedrock.

The solum thickness ranges from 40 to 80 inches. The depth to bedrock is more than 48 inches. Coarse fragments make up 10 to 40 percent of the upper part of the solum and 20 to 70 percent of the lower part of the solum and the C horizon. In unlimed areas the soil ranges from neutral to very strongly acid in the upper part of the solum and is strongly acid or very strongly acid in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 or 3.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 6. The fine-earth fraction is silty clay loam, silty clay, clay, or clay loam. Coatings on ped faces are light gray or gray.

Some pedons have a C horizon that has hue of 10YR through 5YR, value of 3 through 5, and chroma of 3 through 6. The fine-earth fraction is loam, clay, clay loam, silty clay loam, or silty clay.

Fluvaquents

Fluvaquents consist of deep, somewhat poorly drained to very poorly drained soils on flood plains. The soils formed in stratified alluvial sediments along streams and on river islands. Slopes range from 0 to 3 percent.

Fluvaquents commonly are near Udifluvents and Holly and Basher soils but do not have the distinct horizons typical of the Holly and Basher soils and are more poorly drained than Udifluvents.

Because of the variability of Fluvaquents, a typical pedon is not given. Little or no profile development has taken place because the material is recently deposited. The content of coarse fragments ranges from 15 to 80 percent. The soils are extremely acid through strongly acid throughout in unlimed areas.

The A horizon generally is very dark brown (10YR 2/2). It ranges from sandy loam to silt loam and their gravelly or very gravelly analogues. The A horizon is 1 to 8 inches thick.

The C horizon ranges from light brownish gray (10YR 6/2) to dark brown (7.5YR 4/4). It ranges from sand to silty clay loam and their gravelly or very gravelly or cobbly or very cobbly analogues. The depth to low-chroma colors is 6 to 20 inches.

Hagerstown series

Soils of the Hagerstown series are fine, mixed, mesic Typic Hapludalfs. They are deep, well drained soils on side slopes of ridges and on valley floors. The soils formed in residuum weathered from limestone. Slopes range from 3 to 25 percent.

Hagerstown soils are near moderately well drained Washington soils; deep, well drained Edom and Elliber soils; and shallow, well drained Opequon soils. The solum in the Hagerstown soils is thicker than that in the Edom soils. The content of coarse fragments in the control section is less than 35 percent in the Hagerstown soils and more than 35 percent in the Elliber soils.

Typical pedon of Hagerstown silt loam, 8 to 15 percent slopes, Snyder County, Franklin Township, 350 feet north of Route PA 522, 1/4 mile west of Middleburg:

Ap—0 to 8 inches, brown (10YR 5/3) silt loam; weak fine granular structure; very friable, nonsticky, slightly plastic; 10 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21t—8 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; weak coarse subangular blocky structure; friable, slightly sticky, plastic; thin patchy clay films on ped faces; 10 percent coarse fragments; neutral; clear wavy boundary.

B22t—16 to 24 inches; strong brown (7.5YR 5/6) silty clay loam; moderate coarse prismatic structure parting to moderate coarse and medium subangular blocky; friable, sticky, plastic; thin continuous clay films on ped faces; 5 percent coarse fragments; neutral; clear wavy boundary.

B23t—24 to 31 inches; strong brown (7.5YR 5/6) silty clay loam; weak coarse subangular blocky structure; friable, sticky, plastic; thin patchy clay films on ped faces; many thin black coatings on ped faces; slightly acid; gradual wavy boundary.

B24t—31 to 39 inches; strong brown (7.5YR 5/6) silty clay loam; weak coarse subangular blocky structure; friable, sticky, plastic; thin patchy clay films on ped faces; common thin black coatings on ped faces; medium acid; gradual wavy boundary.

B25t—39 to 47 inches; strong brown (7.5YR 5/6) silty clay loam; weak coarse subangular blocky structure; friable, sticky, plastic; thin continuous clay films on ped faces; few to common thin black coatings on ped faces; medium acid; clear wavy boundary.

B26t—47 to 54 inches; yellowish red (5YR 5/6) silty clay loam; moderate coarse subangular blocky structure; firm, sticky, plastic; thin continuous clay films on ped faces; many thin black coatings; slightly acid; clear wavy boundary.

B27t—54 to 62 inches; yellowish brown (10YR 5/4) silty clay loam; weak coarse subangular blocky structure; friable, sticky, plastic; thin continuous clay films in pores; slightly acid; clear wavy boundary.

The solum thickness is 40 to 72 inches. The depth to bedrock is more than 40 inches. The content of coarse fragments ranges from 0 to 15 percent througout. In unlimed areas the soil is strongly acid or very strongly acid in the upper part of the solum and strongly acid to neutral in the lower part of the solum and in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The Bt horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 or 6. It is silty clay loam, clay loam, clay, or silty clay.

Some pedons have a C horizon that has hue of 5YR through 10YR, value of 4 or 5, and chroma of 4 or 6. It is silty clay loam, silty clay, clay loam, or clay.

The Hagerstown soils in this survey area are a taxadjunct to the Hagerstown series because they have a yellower hue (7.5YR) in the B horizon than is defined for the range in the series. This difference does not affect the use or management of the soil.

Hartleton series

Soils of the Hartleton series are loamy-skeletal, mixed, mesic Typic Hapludults. They are deep, well drained soils on ridges. The soils formed in frost-churned residuum or glacial till derived from sandstone and shale. Slopes range from 3 to 25 percent.

Hartleton soils are near deep, well drained Allenwood soils; moderately deep, well drained Berks soils; and shallow, well drained Weikert soils. The content of coarse fragments in the Hartleton soils is higher than in the Allenwood soils.

Typical pedon of Hartleton channery silt loam, 8 to 15 percent slopes, Northumberland County, Upper Mahanoy Township, 0.3 mile south of Route 49010 on Route 49011, 500 feet east of Route 49011:

Ap—0 to 8 inches, dark brown (10YR 4/3) channery silt loam; weak fine granular structure; very friable, nonsticky, slightly plastic; 20 percent coarse fragments; neutral; abrupt smooth boundary.

B1—8 to 16 inches, brown (7.5YR 5/4) channery silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 30 percent coarse fragments; slightly acid; gradual wavy boundary.

B21t—16 to 27 inches, brown (7.5YR 5/4) channery silty clay loam; moderate coarse subangular blocky structure; friable, sticky, plastic; thin patchy clay films on ped faces; 40 percent coarse fragments; medium acid; gradual wavy boundary.

B22t—27 to 45 inches, brown (7.5YR 5/4) very channery clay loam; moderate coarse subangular blocky structure; friable, sticky, slightly plastic; thin patchy clay films on ped faces; 55 percent coarse fragments; strongly acid; gradual wavy boundary.

C—45 to 56 inches, brown (7.5YR 5/4) very channery loam; massive; friable, slightly sticky, nonplastic; 85 percent coarse fragments; strongly acid; abrupt wavy boundary.

R—56 inches, brown (10YR 5/3) sandstone bedrock.

The solum thickness is 30 to 40 inches. The depth to bedrock is more than 40 inches. Coarse fragments make up 15 to 40 percent of the upper part of the solum, 25 to 60 percent of the lower part of the solum, and 50 to 90 percent of the C horizon. In unlimed areas the soil is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 7.5YR or 10YR in the upper part and 5YR through 10YR in the lower part, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction of the B horizon is loam, silt loam, clay loam, or silty clay loam.

The C horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction is loam or silt loam.

Hazleton series

Soils of the Hazleton series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are deep, well drained soils on ridgetops and on the middle and upper side slopes of mountains. The soils formed in residuum weathered from gray and brown sandstone. Slopes range from 0 to 80 percent.

Hazleton soils are near moderately deep, well drained Dekalb soils and deep, well drained Clymer, Ungers, and Laidig soils. The content of coarse fragments is greater in the Hazleton soils than in the Clymer, Ungers, or Laidig soils.

Typical pedon of Hazleton very gravelly sandy loam, in an area of Hazleton and Clymer extremely stony sandy loams, 8 to 25 percent slopes, Union County, Lewis Township, near the top of Jones Mountain at the intersection of the powerline and Jones Mountain Road:

A1—0 to 4 inches, very dark gray (10YR 3/1) very gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; 50 percent coarse fragments; very strongly acid; abrupt smooth boundary.

A2—4 to 8 inches, grayish brown (10YR 5/2) gravelly sandy loam; weak fine granular structure; very friable, nonsticky, nonplastic; 30 percent coarse fragments; extremely acid; clear wavy boundary.

B21—8 to 17 inches, yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22—17 to 25 inches, yellowish brown (10YR 5/6) very gravelly sandy loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 60 percent coarse fragments; very strongly acid; gradual wavy boundary.

B23—25 to 43 inches, strong brown (7.5YR 5/6) very gravelly sandy loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; 50 percent coarse fragments; very strongly acid; gradual wavy boundary.

C—43 to 60 inches, brown (7.5YR 5/4) very gravelly loamy sand; single grain; loose, nonsticky,

nonplastic; 70 percent coarse fragments; very strongly acid.

The solum thickness is 25 to 50 inches. The depth to bedrock is more than 40 inches. The coarse fragment content is 25 to 75 percent in individual subhorizons of the solum and 35 to 80 percent in the C horizon. In unlimed areas the soil is strongly acid to extremely acid throughout. Some pedons contain a thin, discontinuous Bhir horizon.

The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 4 or 5, and chroma of 1 through 4.

The B horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 4 or 6. The fine-earth fraction is loam or sandy loam.

The C horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction is loam, sandy loam, or loamy sand.

Holly series

Soils of the Holly series are fine-loamy, mixed, nonacid, mesic Typic Fluvaquents. They are deep, very poorly drained and poorly drained soils on flood plains. The soils formed in recent alluvium derived from sandstone, siltstone, shale, and limestone. Slopes range from 0 to 3 percent.

Holly soils are near deep, well drained Barbour and Linden soils; deep, moderately well drained Monongahela soils; and deep, moderately well drained and somewhat poorly drained Basher soils.

Typical pedon of Holly silt loam, Adams Township, Snyder County, 110 feet east of Route T586, 50 feet north of Middle Creek:

Ap1—0 to 5 inches, dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable, slightly sticky, slightly plastic; slightly acid; abrupt wavy boundary.

Ap2g—5 to 11 inches, dark grayish brown (10YR 4/2) silt loam; common fine distinct strong brown (7.5YR 5/8) mottles; weak coarse granular structure; friable, slightly sticky, slightly plastic; slightly acid; clear wavy boundary.

B1g—11 to 15 inches, gray (N 5/0) silt loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, nonsticky, slightly plastic; neutral; gradual wavy boundary.

B21g—15 to 24 inches, light gray (N 6/0) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; neutral; gradual wavy boundary.

B22g—24 to 32 inches, gray (N 5/0) silt loam; common fine prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm, nonsticky, slightly plastic; neutral; clear wavy boundary.

B23g—32 to 42 inches, light gray (N 7/0) silty clay loam; many coarse prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky, plastic; neutral; abrupt wavy boundary.

IICg—42 to 60 inches, gray (N 5/0) gravelly loamy sand; single grain; loose, nonsticky, nonplastic; 40 percent coarse fragments; neutral.

The solum thickness is 20 to 44 inches. The depth to stratified material is more than 40 inches. The depth to bedrock is more than 60 inches. The coarse fragment content is 0 to 15 percent in the solum and 0 to 45 percent in the C horizon. The soil ranges from neutral to strongly acid in the upper part of the control section and medium acid to neutral in the lower part of the control section.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The B horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 or less. It is sandy loam, loam, silt loam, or silty clay loam.

The C horizon is neutral or has hue of 7.5YR through 5Y, value of 2 through 6, and chroma of 2 or less. The fine-earth fraction is stratified loamy sand, sand, loam, or silt loam.

Klinesville series

Soils of the Klinesville series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. They are shallow, well drained soils on ridges and hillsides. The soils formed in residuum weathered from acid red shale, sandstone, and siltstone. Slopes range from 3 to 75 percent.

Klinesville soils are near deep, moderately well drained and somewhat poorly drained Albrights soils; moderately deep, well drained Calvin soils; and deep, well drained Leck Kill and Meckesville soils.

Typical pedon of Klinesville shaly silt loam, in an area of Calvin-Klinesville shaly silt loams, 3 to 8 percent slopes, Snyder County, Monroe Township, along Route T504, 0.2 mile north of the Route 54046 bridge over Penns Creek:

Ap—0 to 7 inches, dusky red (2.5YR 3/2) shaly silt loam; moderate fine and medium granular structure; friable, slightly sticky, slightly plastic; 20 percent coarse fragments; slightly acid; abrupt wavy boundary.

B—7 to 11 inches, weak red (10R 4/3) very shaly silt loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; 60 percent coarse fragments; medium acid; clear irregular boundary.

C—11 to 17 inches, weak red (10R 4/3) very shaly silt loam; massive; very friable, nonsticky, nonplastic; 80 percent coarse fragments; strongly acid; clear wavy boundary.
R—17 inches, dusky red (10R 3/3) shale bedrock.

The solum thickness and depth to bedrock range from 10 to 20 inches. The coarse fragment content is 20 to 45 percent in the Ap horizon, 30 to 75 percent in the B horizon, and 50 to 90 percent in the C horizon. In unlimed areas the soil ranges from very strongly acid to medium acid throughout.

The Ap horizon has hue of 5YR through 10R and value and chroma of 2 through 4.

The B horizon has hue of 5YR through 10R, value of 3 or 4, and chroma of 3 through 6. The fine-earth fraction is silt loam or loam.

The C horizon has hue of 5YR through 10R, value of 3 or 4, and chroma of 3 through 6. The fine-earth fraction is silt loam or loam.

Kreamer series

Soils of Kreamer series are clayey, illitic, mesic Aquic Hapludults. They are deep, moderately well drained soils on side slopes of cherty limestone ridges and hills. The soils formed in colluvium weathered from cherty limestone. Slopes range from 3 to 15 percent.

Kreamer soils are near deep, well drained Elliber soils and deep, somewhat poorly drained Evendale soils.

Typical pedon of Kreamer cherty silt loam, 3 to 8 percent slopes, Snyder County, Perry Township, 260 feet south of Route T381, 0.3 mile west of intersection of T381 and Route 54006:

Ap—0 to 12 inches, dark brown (10YR 4/3) cherty silt loam; weak fine granular structure; friable, slightly sticky, slightly plastic; 20 percent coarse fragments; neutral; abrupt wavy boundary.
B1—12 to 23 inches, yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; 10 percent coarse fragments; neutral; clear wavy boundary.
B21t—23 to 28 inches, yellowish brown (10YR 5/6) cherty silty clay loam; few fine distinct light gray (10YR 7/2) and yellowish red (5YR 5/6) mottles; weak very thick platy structure parting to moderate fine blocky; friable, sticky, plastic; thin patchy clay films in pores; 20 percent coarse fragments; neutral; clear wavy boundary.
B22t—28 to 33 inches, strong brown (7.5YR 5/6) silty clay loam; few fine distinct pinkish gray (7.5YR 6/2) and yellowish red (5YR 5/6) mottles; moderate medium blocky structure; firm, sticky, plastic; few thin clay films on ped faces; 10 percent coarse fragments; strongly acid; gradual wavy boundary.
B23t—33 to 51 inches, yellowish red (5YR 5/6) cherty silty clay; common medium distinct light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to moderate medium blocky; firm, sticky, plastic; thick continuous clay films in pores, discontinuous on ped faces; thick black coatings; 25 percent coarse fragments; pale brown (10YR 6/3) coatings on prism faces; strongly acid; diffuse wavy boundary.
B24t—51 to 75 inches, yellowish red (5YR 5/6) cherty silty clay; common medium prominent very pale brown (10YR 7/4) mottles; moderate very coarse prismatic structure parting to moderate coarse blocky; very firm, sticky, plastic; thick continuous clay films in pores and on ped faces; thick black coatings; 25 percent coarse fragments; white (10YR 8/2) coatings on prism faces; strongly acid.

The solum thickness is 40 to 80 inches. The depth to bedrock is more than 60 inches. Coarse fragments make up 10 to 50 percent of the soil. The soil in unlimed areas ranges from neutral to very strongly acid above a depth of 40 inches and is strongly acid or very strongly acid below a depth of 40 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

The B horizon has hue of 10YR or 7.5YR in the upper part and 10YR through 5YR in the lower part, value of 4 through 6, and chroma of 4 through 8. Mottles with chroma of 2 or less are between depths of 15 and 35 inches. The fine-earth fraction is clay, clay loam, silty clay loam, or silty clay.

Laidig series

Soils of the Laidig series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, well drained soils on foot slopes of mountains. The soils formed in colluvium derived from acid sandstone and shale. Slopes range from 3 to 45 percent.

Laidig soils are near deep, moderately well drained Buchanan soils; deep, well drained Hazleton and Meckesville soils; and moderately deep, well drained Dekalb soils. Laidig soils have a Bx horizon, and Hazleton soils do not. Meckesville soils are redder throughout than Laidig soils.

Typical pedon of Laidig gravelly loam, in an area of Laidig and Meckesville extremely stony soils, steep, in woodland, Northumberland County, Point Township, about 1/2 mile south of the Montour County line, along Route T692:

A1—0 to 1 inch, yellowish brown (10YR 5/4) gravelly loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; 20 percent coarse fragments; extremely acid; abrupt smooth boundary.

B1—1 to 4 inches, brownish yellow (10YR 6/6) gravelly loam; weak fine granular structure; friable, sticky, slightly plastic; 25 percent coarse fragments; extremely acid; clear smooth boundary.
B21—4 to 13 inches, brownish yellow (10YR 6/6) gravelly silt loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; 15 percent coarse fragments; extremely acid; gradual wavy boundary.
B22t—13 to 33 inches, strong brown (7.5YR 5/6) channery loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; thin discontinuous clay films in pores; 30 percent coarse fragments; extremely acid; gradual wavy boundary.
Bx—33 to 65 inches, reddish brown (5YR 5/4) very channery loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle, slightly sticky, plastic; thin discontinuous clay films in pores; common black coatings on ped faces and on coarse fragments; 50 percent coarse fragments; gray (10YR 6/1) coatings on prism faces; extremely acid.

The solum thickness is 60 to 80 inches. The depth to bedrock is more than 60 inches. The depth to the Bx horizon ranges from 30 to 50 inches. Coarse fragments make up 15 to 35 percent of the soil above the Bx horizon and 15 to 60 percent of the Bx horizon. Reaction in unlimed areas is strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 2 through 5, and chroma of 1 through 4.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction of the B2 horizon is silt loam, loam, sandy clay loam, or sandy loam.

The Bx horizon has hue of 5YR through 10YR, value of 4 or 5, and chroma of 3 through 8. The fine-earth fraction is loam, sandy clay loam, or silt loam.

Leck Kill series

Soils of the Leck Kill series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on upland ridges and hills. The soils formed in material weathered from red shale, siltstone, and fine-grained sandstone. Slopes range from 3 to 25 percent.

Leck Kill soils are near deep, well drained Meckesville soils; moderately deep, well drained Calvin soils; shallow, well drained Klinesville soils; and deep, moderately well drained and somewhat poorly drained Albrights soils. Leck Kill soils do not have the Bx horizon typical of the Meckesville soils.

Typical pedon of Leck Kill shaly silt loam, 8 to 15 percent slopes, in a cultivated field, Montour County, Mayberry Township, 150 feet west of Route 47001, 100 yards northwest of the cemetery, 0.6 mile north on Route 47001 from its junction with Route 47033:

Ap—0 to 10 inches, reddish brown (5YR 4/3) shaly silt loam; moderate medium granular structure; friable, nonsticky, slightly plastic; 25 percent coarse fragments; medium acid; abrupt smooth boundary.
B21—10 to 16 inches, reddish brown (2.5YR 4/4) shaly silt loam; moderate coarse subangular blocky structure; friable, slightly sticky, slightly plastic; 25 percent coarse fragments; medium acid; gradual wavy boundary.
B22t—16 to 30 inches, red (2.5YR 4/6) shaly silt loam; weak coarse subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films on ped faces; 20 percent coarse fragments; strongly acid; gradual wavy boundary.
B23t—30 to 43 inches, red (2.5YR 4/6) shaly silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin discontinuous clay films on ped faces; 30 percent coarse fragments; strongly acid; gradual wavy boundary.
C—43 to 56 inches, reddish brown (2.5YR 4/4) very shaly silt loam; weak coarse subangular blocky structure; friable, nonsticky, slightly plastic; 65 percent coarse fragments; strongly acid; abrupt wavy boundary.
R—56 inches, red (10R 4/6) shale bedrock.

The solum thickness is 24 to 48 inches. The depth to bedrock is more than 40 inches. The coarse fragment content is 10 to 40 percent in the solum and 65 to 85 percent in the C horizon. In unlimed areas the soil ranges from medium acid to very strongly acid throughout.

The A horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 4 or 6. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The C horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 or 5. The fine-earth fraction is loam or silt loam.

Leetonia series

Soils of the Leetonia series are sandy-skeletal, siliceous, mesic Entic Haplorthods. They are deep, well drained and excessively drained soils on broad, flat mountaintops. The soils formed in material weathered from sandstone. Slopes range from 0 to 15 percent.

Leetonia soils are near well drained Hazleton and Ungers soils and moderately deep, well drained Dekalb soils. Leetonia soils have a spodic horizon that Hazleton and Ungers soils do not have and Leetonia soils have more sand throughout.

Typical pedon of Leetonia gravelly loamy sand, in an area of Leetonia extremely stony loamy sand, 0 to 15 percent slopes, Snyder County, West Perry Township, 6

miles west of Route PA 104 on Shade Mountain, in a road cut on the south side of State Forest Road:

O2—1 inch to 0, black organic material.
A2—0 to 5 inches gray (10YR 6/1) gravelly loamy sand; single grain; loose, nonsticky, nonplastic; 20 percent coarse fragments, very strongly acid; abrupt wavy boundary.
B21h—5 to 6 inches, dark brown (7.5YR 4/3) gravelly loamy sand; weak fine subangular blocky structure; very firm, nonsticky, nonplastic; 20 percent coarse fragments; very strongly acid; abrupt wavy boundary.
B22ir—6 to 8 inches, yellowish red (5YR 4/6) gravelly coarse loamy sand; weak fine subangular blocky structure; very firm, nonsticky, nonplastic; 20 percent coarse fragments; very strongly acid; clear wavy boundary.
B23—8 to 14 inches, strong brown (7.5YR 5/6) gravelly coarse loamy sand; weak coarse subangular blocky structure; very friable, nonsticky, nonplastic; 30 percent coarse fragments; very strongly acid; gradual wavy boundary.
B3—14 to 21 inches, strong brown (7.5YR 5/6) very gravelly coarse sand; single grain; loose, nonsticky, nonplastic; 70 percent coarse fragments; very strongly acid; gradual wavy boundary.
C1—21 to 27 inches, brownish yellow (10YR 6/6) very gravelly coarse sand; single grain; loose, nonsticky, nonplastic; 70 percent coarse fragments; very strongly acid; clear wavy boundary.
C2—27 to 36 inches, yellow (10YR 7/6) very gravelly coarse sand; pockets of pale brown (10YR 6/3) weathered sandstone; single grain; loose, nonsticky, nonplastic; 60 percent coarse fragments; very strongly acid; gradual wavy boundary.
C3—36 to 49 inches, pale brown (10YR 6/3) gravelly sand; streaks of pale yellow (2.5Y 7/4); single grain; loose, nonsticky, nonplastic; 35 percent coarse fragments; very strongly acid; clear wavy boundary.
C4—49 to 60 inches, pale yellow (2.5Y 7/4) very gravelly medium sand; single grain; loose, nonsticky, nonplastic; 50 percent coarse fragments; very strongly acid.

The solum thickness is 17 to 34 inches. The depth to bedrock is more than 40 inches. Coarse fragments make up 20 to 70 percent of individual horizons of the solum and 35 to 70 percent of the C horizon. The soil is very strongly acid or extremely acid throughout.

Some pedons have an A1 horizon with hue of 10YR through 5YR, value of 2 or 3, and chroma of 1 or 2. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1. The fine-earth fraction of the A2 horizon is loamy sand or sand.

The Bh horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 3 or 4. The fine-earth fraction is loamy sand. The Bir horizon has hue of 7.5YR or 5YR, value of 2 through 4, and chroma of 4 or 6. The B2 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction is loamy sand. The B3 horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. The fine-earth fraction of the B3 horizon is sand.

The C horizon has hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 3 through 6. The fine-earth fraction is sand or loamy sand.

Linden series

Soils of the Linden series are coarse-loamy, mixed, mesic Fluventic Dystrochrepts. They are deep, well drained soils on flood plains. The soils formed in recent alluvium from acid sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Linden soils are near well drained Barbour soils, moderately well drained and somewhat poorly drained Basher soils, and very poorly drained and poorly drained Holly soils. Linden soils do not have a IIC horizon, and Barbour soils have a IIC horizon at a depth of less than 40 inches.

Typical pedon of Linden silt loam, Union County, White Deer Township, 1/2 mile north of Interstate Route 80, 100 feet west of the Susquehanna River:

Ap—0 to 10 inches, dark brown (10YR 3/3) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; strongly acid; clear smooth boundary.
B21—10 to 27 inches, dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable, nonsticky, nonplastic; strongly acid; clear smooth boundary.
B22—27 to 48 inches, reddish brown (5YR 4/4) silt loam; weak coarse subangular blocky structure; friable, nonsticky, nonplastic; very strongly acid; clear wavy boundary.
C—48 to 60 inches, brown (7.5YR 4/4) fine sandy loam; massive; very friable, nonsticky, nonplastic; very strongly acid; clear wavy boundary.

The solum thickness is 24 to 50 inches, and the depth to bedrock is more than 60 inches. The coarse fragment content ranges from 0 to 10 percent in the A and B2 horizons, from 0 to 25 percent in the C horizon above a depth of 40 inches, and from 0 to 80 percent in the C horizon below a depth of 40 inches. In unlimed areas the soil is medium acid to extremely acid throughout.

The Ap horizon has hue of 5YR through 10YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 7.5YR through 2.5YR, value of 3 through 5, and chroma of 3 or 4. The fine-earth fraction is silt loam, loam, fine sandy loam, or sandy loam.

The C horizon has hue of 10YR through 2.5YR, value of 3 through 5, and chroma of 3 or 4. The fine-earth fraction is loam, sandy loam, or fine sandy loam above a

depth of 40 inches and fine sandy loam, sandy loam, or sand below a depth of 40 inches.

Meckesville series

Soils of the Meckesville series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, well drained soils on lower and middle slopes of hills and ridges. The soils formed in colluvium or glacial till weathered from red sandstone and shale. Slopes range from 3 to 35 percent.

Meckesville soils are on the landscape near deep, well drained Laidig and Leck Kill soils; moderately deep, well drained Calvin soils; shallow, moderately well drained Klinesville soils; and deep, well drained and somewhat poorly drained Albrights soils. Meckesville soils have a Bx horizon, and Leck Kill soils do not. Meckesville soils are redder than Laidig soils.

Typical pedon of Meckesville silt loam, 3 to 8 percent slopes, Northumberland County, Rush Township, 0.3 mile west of Route PA 54 on Route 49139, in a road cut on the south side of the road:

A1—0 to 4 inches, dark brown (7.5YR 4/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky, slightly plastic; 5 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B21—4 to 13 inches, reddish brown (5YR 5/4) silt loam; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; 5 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—13 to 25 inches, reddish brown (5YR 4/4) silt loam; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films on ped faces; 5 percent coarse fragments; extremely acid; gradual wavy boundary.

B23t—25 to 36 inches, reddish brown (5YR 5/3) silt loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films in pores and on ped faces; 10 percent coarse fragments; extremely acid; clear wavy boundary.

Bx—36 to 60 inches, reddish brown (5YR 4/4) gravelly silty clay loam; weak very coarse prismatic structure; thin continuous clay films in pores; very firm, brittle, slightly sticky, slightly plastic; 20 percent coarse fragments; pinkish gray (7.5YR 6/2) coatings on prism faces; very strongly acid.

The solum thickness is 40 to 80 inches. The depth to bedrock is more than 60 inches. The depth to the Bx horizon ranges from 30 to 48 inches. The coarse fragment content is 5 to 20 percent in the upper part of the solum, 10 to 50 percent in the lower part of the solum, and 20 to 70 percent in the C horizon. In unlimed areas the soil ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 5YR or 7.5YR, value of 2 through 5, and chroma of 2 through 4.

The Bt horizon has hue of 5YR through 10R, value of 3 through 5, and chroma of 3 through 6. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The Bx horizon has hue of 5YR through 10R and value and chroma of 3 or 4. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

Some pedons have a C horizon with hue of 5YR or 2.5YR and value and chroma of 3 or 4. The fine-earth fraction is loam, silty clay loam, or clay loam.

Monongahela series

Soils of the Monongahela series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, moderately well drained soils on flat to slightly convex stream terraces. The soils formed in material derived from old stream alluvium. Slopes range from 0 to 8 percent.

Monongahela soils are on terraces near well drained Wheeling soils and on flood plains near poorly drained and very poorly drained, rarely flooded Holly soils and moderately well drained and somewhat poorly drained Basher soils.

Typical pedon of Monongahela silt loam, 0 to 3 percent slopes, Snyder County, Monroe Township, 1/2 mile east of the junction of Route PA 204 and Route 54013, 75 feet northwest of Route 54013:

Ap—0 to 10 inches, dark brown (10YR 4/3) silt loam; weak medium granular structure; friable, nonsticky, slightly plastic; 5 percent coarse fragments; neutral; abrupt smooth boundary.

B21t—10 to 23 inches, yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films on ped faces and in pores; 5 percent coarse fragments; slightly acid; clear wavy boundary.

Bx1—23 to 33 inches, dark brown (7.5YR 4/4) loam; common medium distinct reddish brown (5YR 4/4) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm, brittle, slightly sticky, nonplastic; 10 percent fragments; light brownish gray (10YR 6/2) coatings on prism faces slightly acid; gradual wavy boundary.

Bx2—33 to 48 inches, yellowish brown (10YR 5/4) loam; common medium distinct reddish brown (5YR 4/4) mottles; weak very coarse prismatic structure parting to weak medium subangular blocky; firm, brittle, nonsticky, slightly plastic; 10 percent coarse fragments; light brownish gray (10YR 6/2) coatings on prism faces; slightly acid; gradual wavy boundary.

C—48 to 63 inches, brown (7.5YR 5/4) silt loam; many medium faint strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to weak

fine subangular blocky; firm, slightly sticky, slightly plastic; 10 percent coarse fragments; light brownish gray (10YR 6/2) coatings on prism faces; strongly acid.

The solum thickness is 40 to 65 inches. The depth to bedrock is more than 60 inches. The depth to the Bx horizon ranges from 18 to 30 inches. The coarse fragment content ranges from 5 to 15 percent in the A and B horizons, from 10 to 25 percent in the Bx horizon, and from 10 to 40 percent in the C horizon. In unlimed areas the soil is strongly acid or very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt and Bx horizons have hue of 7.5YR or 10YR and value and chroma of 4 or 5. The fine-earth fraction is loam or silt loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 or 5. The fine-earth fraction is loam, silt loam, or sandy loam.

Opequon series

Soils of the Opequon series are clayey, mixed, mesic Lithic Hapludalfs. They are shallow, well drained soils on limestone ridges. The soils formed in material weathered from limestone. Slopes range from 3 to 50 percent.

Opequon soils are on the landscape near deep, well drained Elliber, Hagerstown, and Edom soils and deep, moderately well drained Washington soils. Bedrock is at a depth of 12 to 20 inches in the Opequon soils and at a depth of more than 40 inches in the other soils.

Typical pedon of Opequon silty clay loam, 8 to 25 percent slopes, Union County, Buffalo Township, 1/2 mile north of the junction of Routes PA 192 and T450, 1/4 mile west of T450:

Ap—0 to 5 inches, dark brown (7.5YR 3/2) silty clay loam; moderate fine granular structure; very friable, slightly sticky, slightly plastic; 10 percent coarse fragments; neutral; abrupt smooth boundary.

B21t—5 to 13 inches, yellowish red (5YR 5/6) silty clay; strong medium and fine subangular blocky structure; friable, sticky, plastic; thin continuous clay films on ped faces; 10 percent coarse fragments; neutral; gradual wavy boundary.

B22t—13 to 16 inches, reddish brown (5YR 5/4) channery silty clay; strong medium and fine subangular blocky structure; friable, sticky, plastic; thin continuous clay films on ped faces; 30 percent coarse fragments; neutral; abrupt smooth boundary.

R—16 inches, dark gray (N 4/0) limestone bedrock.

The solum thickness and depth to bedrock are 12 to 20 inches. The coarse fragment content ranges from 0 to 15 percent in the upper part of the solum and from 15 to 35 percent in the lower part. In unlimed areas the soil ranges from neutral to medium acid throughout.

The Ap horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 2 or 3.

The Bt horizon has hue of 7.5YR through 2.5YR, value of 4 through 6, and chroma of 4 or 6. The fine-earth fraction is silty clay loam, silty clay, or clay.

Shelmadine series

Soils of the Shelmadine series are fine-loamy, mixed, mesic Typic Fragiaquults. They are deep, poorly drained soils on flat to slightly concave uplands, in depressions, and along small drainageways. The soils formed in material weathered from pre-Wisconsin-age glacial till. Slopes range from 0 to 8 percent.

Shelmadine soils are near somewhat poorly drained Alvira soils, moderately well drained Watson soils, well drained Allenwood soils; shallow, well drained Weikert soils; and moderately deep, well drained Berks soils.

Typical pedon of Shelmadine silt loam, 0 to 3 percent slopes, Union County, Gregg Township, 1.75 miles west of US Route 15, 0.3 mile south of the Lycoming County line, 50 feet north of Prison Road:

Ap—0 to 5 inches, dark gray (10YR 4/1) silt loam; weak medium granular structure; friable, slightly sticky, slightly plastic; 5 percent coarse fragments; strongly acid; clear smooth boundary.

B21tg—5 to 12 inches, grayish brown (10YR 5/2) silty clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; thin continuous clay films on ped faces; 5 percent coarse fragments; strongly acid; clear wavy boundary.

B22tg—12 to 29 inches, gray (10YR 6/1) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable, sticky, plastic; thin continuous clay films on ped faces; 5 percent coarse fragments; strongly acid; clear wavy boundary.

Bxg—29 to 51 inches, brown (7.5YR 5/2) channery loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; firm, brittle, slightly sticky, slightly plastic; 20 percent coarse fragments; gray (10YR 6/1) coatings on prism faces; medium acid; gradual wavy boundary.

C—51 to 61 inches, brown (10YR 5/3) channery loam; common medium faint light brownish gray (10YR 6/2) mottles; massive; friable, nonsticky, nonplastic; 15 percent coarse fragments; medium acid.

The solum thickness is 40 to 60 inches. The depth to bedrock is more than 60 inches. The depth to the Bx horizon ranges from 18 to 30 inches. The coarse fragment content ranges from 5 to 25 percent in the

solum and from 15 to 60 percent in the C horizon. In unlimed areas the soil is very strongly acid or extremely acid throughout.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 1 or 2.

The Bt horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 and is mottled. The fine-earth fraction is silt loam or silty clay loam.

The Bx horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 4. The fine-earth fraction is silt loam, loam, or silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 6. The fine-earth fraction is silt loam or loam.

Udifluvents

Udifluvents consist of deep, moderately well drained to excessively drained soils on flood plains. The soils formed in stratified alluvial sediments. They are along streams and on river islands. Slopes range from 0 to 3 percent.

Udifluvents commonly are near Fluvaquents and Holly, Basher, Barbour, and Linden soils but are in positions where frequent stream overflow causes deposition and erosion. Udifluvents do not have the distinct horizons typical of the Holly, Basher, Barbour, and Linden soils and are better drained than Fluvaquents.

Because of the variability of Udifluvents, a typical pedon is not given. Little or no profile development occurs in these recent deposits. The depth to bedrock is more than 4 feet. The content of coarse fragments ranges from 15 to 80 percent. The soils are extremely acid to strongly acid throughout.

The A horizon is dominantly dark brown (7.5YR 3/2) to brown (10YR 4/3). It ranges from loamy sand to silt loam and their gravelly or very gravelly analogues. The A horizon is 1 to 6 inches thick.

The C horizon is pale brown (10YR 6/3) to reddish brown (5YR 4/4). It mainly ranges from sandy loam to loam. Some pedons have thin layers of sand, and some pedons have sand below a depth of 40 inches.

Ungers series

Soils of the Ungers series are fine-loamy, mixed, mesic Typic Hapludults. They are deep, well drained soils on convex ridges and on middle and upper side slopes of mountains. The soils formed in material derived from fine-grained red sandstone. Slopes range from 3 to 50 percent.

Ungers soils are near deep, well drained Hazleton, Laidig, and Meckesville soils and moderately deep, well drained Dekalb soils. Ungers soils do not have the Bx horizon typical of the Laidig and Meckesville soils. Ungers soils have an argillic horizon, and Hazleton soils do not.

Typical pedon of Ungers channery loam, in an area of Ungers very stony loam, 8 to 25 percent slopes, Snyder County, Spring Township, 1/2 mile southwest of Snyder-Middleswarth State Park along Forest Road, 300 feet east of road:

O1—3 inches to 1 inch, undecomposed leaf and twig litter and moss.

O2—1 inch to 0, dark decomposed organic material.

A1—0 to 2 inches, very dark brown (10YR 2/2) channery loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; 20 percent coarse fragments; very strongly acid; abrupt smooth boundary.

B1—2 to 8 inches, dark brown (7.5YR 4/4) channery loam; weak fine granular structure; very friable, slightly sticky, slightly plastic; 20 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—8 to 14 inches, reddish brown (5YR 4/3) channery sandy clay loam; weak fine and medium subangular blocky structure parting to moderate fine and medium granular; friable, slightly sticky, slightly plastic; thin patchy clay films on ped faces; 20 percent coarse fragments; very strongly acid; gradual wavy boundary.

B22t—14 to 34 inches, reddish brown (5YR 4/3) channery sandy clay loam; moderate fine and medium subangular blocky structure; firm, sticky, slightly plastic; thin patchy clay films on ped faces and coarse fragments; some black coatings in lower part; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

B3—34 to 40 inches, dark reddish brown (5YR 3/4) channery sandy loam; weak fine and medium subangular blocky structure; firm, nonsticky, slightly plastic; common fine and medium black coatings; 40 percent coarse fragments; very strongly acid; gradual irregular boundary.

C—40 to 54 inches, dark reddish brown (5YR 3/4) very channery sandy loam; massive; firm, nonsticky, nonplastic; few black coatings; 70 percent coarse fragments; very strongly acid.

R—54 inches, weak red (10YR 4/3) sandstone.

The solum thickness is 30 to 55 inches. The depth to bedrock is more than 40 inches. Coarse fragments make up 15 to 30 percent of the A horizon, 15 to 60 percent of the B horizon, and 40 to 80 percent of the C horizon. In unlimed areas the soil is very strongly acid or extremely acid throughout.

The A1 horizon has hue of 10YR through 5YR and value and chroma of 1 or 2. Some pedons have a thin A2 horizon.

The B1 horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. The B2t and B3 horizons have hue of 2.5YR or 5YR, value of 3 through 5, and chroma of 3 or 4. The fine-earth fraction of the B1 and

B3 horizons is sandy loam or loam. The fine-earth fraction of the B2t horizon is loam or sandy clay loam.

The C horizon has hue of 5YR or 2.5YR and value and chroma of 3 or 4. The fine-earth fraction is sandy loam or loam.

Washington series

Soils of the Washington series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on hills. The soils formed in pre-Wisconsin-age glacial till derived from sandstone, siltstone, shale, and limestone. Slopes range from 3 to 15 percent.

Washington soils are on the landscape near well drained Allenwood, Edom, and Hagerstown soils and moderately well drained Watson soils. Washington soils are coarser textured than Edom soils and have a browner hue in the subsoil than Allenwood soils.

Typical pedon of Washington silt loam, an area of Allenwood and Washington soils, 3 to 8 percent slopes, in a hayfield, Union County, Hartley Township, 3/4 mile west of Millmont, 1/2 mile north of the junction of Routes T320 and 59005, 750 feet west of Route T320:

Ap—0 to 8 inches, dark brown (10YR 3/3) silt loam; weak fine granular structure; friable, nonsticky, nonplastic; 10 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21t—8 to 13 inches, strong brown (7.5YR 5/6) gravelly silty clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin continuous clay films in pores; 30 percent coarse fragments; slightly acid; gradual wavy boundary.

B22t—13 to 25 inches, strong brown (7.5YR 5/6) gravelly clay loam; weak medium subangular blocky structure; friable, sticky, plastic; thin continuous clay films in pores; 20 percent coarse fragments; neutral; gradual wavy boundary.

B23t—25 to 41 inches, yellowish brown (10YR 5/6) gravelly clay loam; weak medium subangular blocky structure; friable, sticky, plastic; thin continuous clay films in pores and on ped faces; 20 percent coarse fragments; medium acid; gradual wavy boundary.

B24t—41 to 48 inches, yellowish brown (10YR 5/6) gravelly clay loam; moderate coarse subangular blocky structure; firm, sticky, plastic; thin continuous clay films in pores and on ped faces; 20 percent coarse fragments; medium acid; clear wavy boundary.

C—48 to 62 inches, brownish yellow (10YR 6/6) clay loam; massive; firm, sticky, plastic; 10 percent coarse fragments; medium acid.

The solum thickness is 40 to 60 inches. The depth to bedrock is more than 60 inches. The coarse fragment content ranges from 5 to 35 percent throughout the profile. The soil in unlimed areas is medium acid to neutral throughout.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 5 through 8. The fine-earth fraction is clay loam, silty clay loam, or silt loam. In some pedons the lower part of the B horizon has high-chroma mottles.

The C horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 6 or 8. The fine-earth fraction is clay loam, loam, or silt loam. In some pedons the C horizon is mottled.

Watson series

Soils of the Watson series are fine-loamy, mixed, mesic Typic Fragiudults. They are deep, moderately well drained soils on glaciated hills and ridges. The soils formed in material weathered from pre-Wisconsin-age glacial till. Slopes range from 0 to 15 percent.

Watson soils are near well drained Allenwood and Hartleton soils, somewhat poorly drained Alvira soils, and poorly drained Shelmadine soils.

Typical pedon of Watson silt loam, 3 to 8 percent slopes, Snyder County, Washington Township, 1 mile north of Kantz, 100 feet east of Route 54065:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable, nonsticky, slightly plastic; 10 percent coarse fragments; medium acid; abrupt smooth boundary.

B21t—9 to 18 inches, yellowish red (5YR 5/6) gravelly silty clay loam; moderate fine and medium subangular blocky structure; friable, slightly sticky, plastic; thin patchy clay films on ped faces; 30 percent coarse fragments; strongly acid; clear smooth boundary.

B22t—18 to 27 inches, yellowish red (5YR 5/6) gravelly silty clay loam; moderate coarse prismatic structure parting to strong medium blocky; firm, slightly sticky, plastic; thin continuous clay films on ped faces; 20 percent coarse fragments; very strongly acid; abrupt wavy boundary.

Bx1—27 to 35 inches, strong brown (7.5YR 5/6) gravelly silty clay loam; few medium prominent light brownish gray (2.5YR 6/2) mottles; weak very coarse prismatic structure parting to moderate medium and coarse subangular blocky; very firm, brittle, slightly sticky, plastic; thin clay films on ped faces; 25 percent coarse fragments; strongly acid; gradual wavy boundary.

Bx2—35 to 45 inches, strong brown (7.5YR 5/6) gravelly clay loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm, brittle, slightly sticky, slightly plastic; thin patchy clay films on ped faces; 45 percent coarse fragments; very strongly acid; abrupt wavy boundary.

IIC1—45 to 52 inches, light yellowish brown (10YR 6/4) loam; many fine and medium prominent light gray (2.5Y 7/1) and strong brown (7.5YR 5/6) mottles; massive; firm, slightly sticky, plastic; 10 percent coarse fragments; very strongly acid; abrupt wavy boundary.

IIC2—52 to 61 inches, strong brown (7.5YR 5/6) shaly loam; common medium distinct light gray (2.5Y 7/2) and yellowish red (5YR 5/6) mottles; massive; friable, slightly sticky, slightly plastic; 20 percent coarse fragments; very strongly acid.

The solum thickness is 40 to 70 inches. The depth to bedrock is more than 60 inches. The depth to the fragipan is 18 to 32 inches. The coarse fragment content ranges from 5 to 15 percent in the surface layer, 10 to 35 percent in the B2t horizon, and 10 to 50 percent in the Bx and C horizons. In unlimed areas the soil is very strongly acid or strongly acid throughout.

The A horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 2 through 4.

The B2t horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 4 through 8. The fine-earth fraction is silt loam, silty clay loam, loam, or clay loam.

The Bx horizon has hue of 7.5YR through 2.5YR, value of 4 through 6, and chroma of 4 or 6. The fine-earth fraction is silt loam, loam, silty clay loam, or clay loam.

The C horizon has hue of 10YR through 2.5YR, value of 4 through 6, and chroma of 4 through 8. The fine-earth fraction is silt loam, loam, or sandy loam.

Weikert series

Soils of the Weikert series are loamy-skeletal, mixed, mesic Lithic Dystrochrepts. They are shallow, well drained soils on ridgetops and side slopes. The soils formed in material derived from acid gray shale. Slopes range from 3 to 75 percent.

Weikert soils are near deep, well drained Bedington and Hartleton soils; moderately deep, well drained Berks soils; and deep, moderately well drained Watson soils.

Typical pedon of Weikert shaly silt loam, 8 to 15 percent slopes, Snyder County, West Beaver Township, 1/2 mile southeast of Bannerville, in a shale pit, 20 feet north of Route T534, 0.15 mile southeast of Route T467:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) shaly silt loam; weak fine and medium granular structure; very friable, slightly sticky, nonplastic; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B2—7 to 10 inches, dark yellowish brown (10YR 4/4) very shaly silt loam; weak fine subangular blocky structure; very friable, slightly sticky, nonplastic; 65 percent coarse fragments; slightly acid; gradual wavy boundary.

C—10 to 15 inches, dark yellowish brown (10YR 4/4) very shaly loam; massive, very friable, nonplastic; 85 percent coarse fragments; slightly acid; gradual wavy boundary.

R—15 inches, gray (10YR 5/1) acid shale bedrock.

The solum thickness and depth to bedrock are 10 to 20 inches. Coarse fragments make up 20 to 50 percent of the Ap horizon, 30 to 65 percent of the B horizon, and 60 to 85 percent of the C horizon. In unlimed areas the soil is very strongly acid to medium acid throughout.

The Ap horizon has hue of 10YR, value of 3 through 5, and chroma of 2 or 3.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction is silt loam or loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. The fine-earth fraction is silt loam or loam.

Wheeling series

Soils of Wheeling series are fine-loamy, mixed, mesic Ultic Hapludalfs. They are deep, well drained soils on terraces. The soils formed in outwash deposits overlying stratified sands and gravel. Slopes range from 0 to 8 percent.

Wheeling soils are near moderately well drained Monongahela soils, poorly drained and very poorly drained Holly soils, and moderately well drained and somewhat poorly drained Basher soils.

Typical pedon of Wheeling silt loam, in an area of Wheeling soils, 3 to 8 percent slopes, Snyder County, Monroe Township, east bank of Route T502, 150 feet south of Route 54013:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable, slightly sticky, slightly plastic; slightly acid; abrupt smooth boundary.

A12—9 to 19 inches, dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; strongly acid; gradual wavy boundary.

B21t—19 to 29 inches, yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films in pores and on ped faces; strongly acid; gradual wavy boundary.

B22t—29 to 36 inches, brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; thin patchy clay films on ped faces; strongly acid; gradual wavy boundary.

B3—36 to 42 inches, dark brown (7.5YR 4/4) fine sandy loam; weak medium blocky structure; firm, nonsticky, nonplastic; thin patchy clay films on ped faces; 10

percent coarse fragments; strongly acid; clear wavy boundary.

IIC—42 to 60 inches, dark brown (10YR 4/3) gravelly sand; single grain; loose, nonsticky, nonplastic; 40 percent gravel; strongly acid.

The solum thickness is 40 to 60 inches. The depth to bedrock is more than 60 inches. The coarse fragment content ranges from 0 to 15 percent above a depth of 40 inches and from 0 to 45 percent below 40 inches. In unlimed areas the soil is strongly acid to medium acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is loam, silt loam, or fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. The B2t horizon is loam, clay loam, silty clay loam, or silt loam. The B3 horizon is fine sandy loam or sandy loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 6. The C horizon is stratified sand and gravel.

Wyoming series

Soils of the Wyoming series are loamy-skeletal, mixed, mesic Typic Dystrochrepts. They are deep and somewhat excessively drained and are on terraces. The soils formed in outwash and water-sorted material derived from sandstone, siltstone, and shale. Slopes range from 3 to 8 percent.

Wyoming soils are near well drained Wheeling, Barbour, and Linden soils and moderately well drained Monongahela soils. Wyoming soils have a coarser textured solum than Wheeling soils. Wyoming soils are on terraces, and Barbour and Linden soils are on flood plains.

Typical pedon of Wyoming gravelly sandy loam, 0 to 3 percent slopes, Northumberland County, Point Township, 4 miles northeast of Northumberland on Route US 11, 1/4 mile north of Route US 11 on Epler Farm Road, 50 feet east of road:

Ap—0 to 10 inches, dark brown (10YR 4/3) gravelly sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; 25 percent coarse fragments; slightly acid; abrupt smooth boundary.

B2—10 to 22 inches, brown (7.5YR 5/4) gravelly sandy loam; weak fine subangular blocky structure; friable, nonsticky, nonplastic; 40 percent coarse fragments; medium acid; clear wavy boundary.

B3—22 to 26 inches, brown (7.5YR 5/4) very gravelly coarse sandy loam; weak fine subangular blocky structure; very friable, nonsticky, nonplastic; 60 percent coarse fragments; medium acid; gradual wavy boundary.

C—26 to 60 inches, dark brown (10YR 4/3) very gravelly loamy coarse sand; single grain; loose, nonsticky, nonplastic; 75 percent coarse fragments; strongly acid.

The solum thickness is 18 to 35 inches. The depth to bedrock is generally more than 5 feet. The coarse-fragment content ranges from 20 to 40 percent in the Ap horizon, 20 to 60 percent in the B2 horizon, and 35 to 75 percent in the B3 and C horizons. The soil in unlimed areas is extremely acid to medium acid throughout.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3.

The B horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 or 4. The fine-earth fraction is generally sandy loam in the B2 horizon and coarse sandy loam in the B3 horizon.

The C horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 or 4. The fine-earth fraction is sandy loam, loamy sand, or sand.

Formation of the Soils

This section describes the factors and processes of soil formation, the processes of horizon differentiation, and the major soil horizons.

Factors of Soil Formation

The characteristics of the soil at any given place are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of soil development have acted on the soil material.

Climate and vegetation act on the parent material that has accumulated through the weathering of rocks and bring about the development of soil horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that is formed and, in extreme cases, determines it almost entirely. Finally, time is needed to change the parent material into a soil. Generally, a long time is required for distinct horizons to develop.

Parent Material

Parent material is the unconsolidated mass from which soils form. The soils of Union County formed mainly in material derived from highly folded sedimentary rocks of sandstone, shale, and limestone. Some soils formed in place in residuum directly over the original bedrock. Hagerstown, Elliber, and Opequon soils formed in material weathered from limestone. Soils such as the Hazleton, Dekalb, and Clymer soils formed in material derived from sandstone; Berks, Bedington, and Calvin soils formed in material derived dominantly from shale.

Some soils formed in material that slipped or otherwise moved downhill to lower positions on the landscape. Among these are Evendale soils, which formed in material influenced by limestone; Laidig and Buchanan soils, which formed in material derived from sandstone and shale; and Albrights soils, which formed in material derived from shale and siltstone.

Some soils formed in stream-deposited material. These deposits may be very old or of recent origin. The Monongahela and Wheeling soils on terraces formed in old stream deposits. Soils on flood plains, such as Basher and Holly soils, formed in deposits of recent origin.

Plant and Animal Life

All living organisms affect soil formation. These include vegetation, animals, and bacteria, fungi, and other micro-organisms. The vegetation strongly affects the organic-matter content and the amount of plant nutrients in the soil. Animals such as earthworms, cicadas, and burrowing animals help mix partly decomposed organic matter with the mineral soil material, helping to keep the soil porous for water and air movement. This mixing action also improves the environmental conditions for certain micro-organisms to further digest these organic materials, which in turn releases the nutrients needed for plant growth.

Most of the soils in Union County developed under forest stands mainly of oak, chestnut, maple, and hickory. Under these conditions, the soil surface had a covering of leaf litter. The upper part of the surface layer was dark colored, and the lower part was light colored. This color pattern is similar to that of the soils of the Hazleton series. The organic matter and plant nutrients were concentrated in the top 4 inches of the soil. When the land was cleared and farmed, the organic matter and plant nutrients were mixed to plow depth.

Climate

The climate of Union County is a humid-temperate, continental type characteristic of the Middle Atlantic States. Some characteristics of the soil profiles indicate that this kind of climate prevailed when the soils were forming, and that it influenced soil development.

The effect of climate on the formation of soils has been nearly uniform throughout the county. The development of some soils, however, may have been influenced by a microclimate caused by differences in relief.

Relief

The relief of the county is dominated by steep slopes and narrow to moderately wide valley floors. The relief is influenced by underlying sloping bedrock and by erosion and other water-influenced geologic processes. The highest ridges in the county, such as in areas of the Hazleton and Dekalb soils, are over sandstone bedrock,

which is highly resistant to weathering. Soils such as Elliber and Hagerstown soils, however, are in the moderately wide valleys that have undulating slopes over limestone bedrock, which is readily weathered. Moderately resistant bedrock and the concentration of runoff over readily eroded soils create the highly dissected hills typical of the shale bedrock areas of the county. The accumulation of soil material by washing, creeping, slippage, and gravity at the base of steep slopes is typical of the foot-slope relief of the Buchanan and Laidig soils.

Time

The length of time the other factors of soil formation have operated is indicated, to some extent, by the degree of development of the soil profile. Some soils, especially those that formed in alluvium, show little profile development because the soil material has not been in place long enough for distinct horizons to form. Examples of soils that formed in alluvium are Holly and Basher soils. These soils show little horizon development because they are continually receiving fresh material that is deposited on the surface. They are called young, or recent, soils.

The profile development of Weikert, Berks, and Dekalb soils shows that some changes have taken place in the parent material. These changes, however, do not represent the effects of advanced weathering. Weathering and the profile development of those soils have been slowed by the effects of relief and by the kind of parent material.

Bedington, Laidig, and Allenwood soils have a well developed profile. In these soils, the parent material has been in place long enough for distinct horizons to develop.

Processes of Horizon Differentiation

As weathering proceeds and plants grow on a young soil, several processes are apparent that tend to cause layers, or horizons, to develop in the soil. Soils gain material when leaves and plant remains accumulate on the surface. This accumulation is easily seen in areas of Dekalb, Clymer, Hazleton, and other soils that formed under forest and have not been plowed. Additions of organic matter, chemicals, and mineral material are also brought in from adjacent areas by animals, floodwaters, and wind, or they are transferred as a result of gravity.

There are losses of minerals from the soils when primary minerals decompose, and some of the products of weathering are leached from the soils in solution. This process is apparent in Elliber and Hagerstown soils, where calcium carbonate has been leached. There are also losses of minerals when plant nutrients are removed in harvested plants. In addition, fine particles of soil material are removed by erosion, and gases escape as organic matter decomposes.

The transfer or translocation of material from one part of the soil to another is common in most soils. Organic matter is moved from the upper part of the profile to the lower part in suspension or solution. Calcium is leached from the surface layer and is held by the clay in the subsoil. The results of this process can be seen in Bedington and Edom soils. In these soils, clay has transferred from horizons higher in the profile and has accumulated in the B horizon.

Bases and plant nutrients are moved upward when they are absorbed by the roots of plants, and they rise in the stem and are stored in the leaves and twigs. When the plant dies and decays, the plant nutrients are returned to the soil.

Elements in the soil undergo transformation as chemical weathering takes place. During the process of chemical weathering, iron, aluminum, calcium, and other elements are released from the primary and secondary minerals in the soil. The parent material of a well drained Hagerstown soil, for example, is gray and white and is gradually transformed into the red, brown, and yellow colors of oxidized iron compounds as the parent material weathers. This change in color indicates that iron has been released or that ferrous oxide has been oxidized to ferric oxide in the presence of an adequate supply of oxygen.

Major Soil Horizons

The results of the soil-forming processes are reflected in the different horizons developed in a soil profile. The soil profile extends from the surface downward to materials that are little altered by the soil-forming processes.

Most soils contain three major horizons, called A, B, and C horizons. These horizons can be subdivided by the use of numbers and letters to indicate changes within one horizon. An example is the B2t horizon, a layer within the B horizon that contains an accumulation of clay.

The A horizon is the surface layer. It contains the A1 horizon, which has the largest accumulation of organic matter. It also contains the A2 horizon, which is the horizon of maximum leaching, or eluviation, of clay and iron.

The B horizon lies underneath the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the A horizon. In some soils, the B horizon forms through alteration in place rather than from illuviaton. The alteration may be caused by oxidation and reduction of iron or by the weathering of clay minerals. The B horizon commonly has blocky or prismatic structure and is generally firmer and lighter in color than the A1 horizon and darker than the C horizon.

The C horizon is below the A and B horizons. It consists of material that could have been modified by weathering but that is relatively unaffected by the biological, physical, or chemical processes involved in the formation of the A and B horizons.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that some commonly grown crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of most crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1957-75 at Sunbury, Pennsylvania]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	35.7	17.6	26.7	62	-8	16	2.61	1.40	3.58	6	8.4
February---	36.8	17.6	27.2	60	-7	0	2.57	1.24	3.65	5	11.2
March------	47.4	26.9	37.2	76	9	65	3.04	2.15	3.85	6	6.9
April------	60.5	36.7	48.6	88	20	269	3.24	1.70	4.49	7	.6
May--------	71.2	45.8	58.5	92	29	574	3.65	2.12	4.88	8	.0
June-------	79.8	55.9	67.9	95	39	837	4.49	1.73	6.70	6	.0
July-------	84.2	60.2	72.3	96	47	1,001	3.48	2.11	4.70	7	.0
August-----	83.0	58.5	70.7	95	44	952	3.21	1.96	4.33	6	.0
September--	75.9	51.5	63.7	92	33	711	4.01	1.80	5.80	7	.0
October----	64.4	40.0	52.2	83	23	383	2.59	.93	3.92	5	.0
November---	51.6	32.4	42.0	74	15	103	3.22	2.10	4.22	7	1.4
December---	38.8	22.7	30.6	65	-1	34	3.12	1.77	4.22	7	6.3
Yearly:											
Average--	60.8	38.8	49.8	---	---	---	---	---	---	---	---
Extreme--	---	---	---	97	-10	---	---	---	---	---	---
Total----	---	---	---	---	---	4,945	39.23	33.15	45.05	77	34.8

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1957-75 at Sunbury, Pennsylvania]

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 6	May 22	June 11
2 years in 10 later than--	April 19	May 8	May 26
5 years in 10 later than--	March 19	April 10	April 25
First freezing temperature in fall:			
1 year in 10 earlier than--	October 17	October 4	September 20
2 years in 10 earlier than--	October 24	October 10	September 28
5 years in 10 earlier than--	November 6	October 23	October 12

TABLE 3.--GROWING SEASON

[Data were recorded in the period 1957-75 at Sunbury, Pennsylvania]

Probability	Daily minimum temperature during growing season		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	182	150	118
8 years in 10	199	166	135
5 years in 10	231	195	169
2 years in 10	264	225	203
1 year in 10	281	241	221

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AbB	Albrights silt loam, 3 to 8 percent slopes	1,724	0.8
AnA	Allenwood gravelly silt loam, 0 to 3 percent slopes	250	0.1
AnD	Allenwood gravelly silt loam, 15 to 25 percent slopes	194	0.1
AoB	Allenwood and Washington soils, 3 to 8 percent slopes	6,591	3.2
AoC	Allenwood and Washington soils, 8 to 15 percent slopes	2,087	1.0
ArA	Alvira silt loam, 0 to 3 percent slopes	1,429	0.7
ArB	Alvira silt loam, 3 to 8 percent slopes	2,149	1.1
ArC	Alvira silt loam, 8 to 15 percent slopes	65	*
Ba	Barbour soils, frequently flooded	276	0.1
Bb	Barbour-Linden complex, rarely flooded	527	0.3
Bc	Basher soils	586	0.3
Bd	Basher soils, frequently flooded	2,167	1.1
BeB	Bedington silt loam, 3 to 8 percent slopes	550	0.3
BeC	Bedington silt loam, 8 to 15 percent slopes	440	0.2
BkB	Berks shaly silt loam, 3 to 8 percent slopes	2,261	1.1
BkC	Berks shaly silt loam, 8 to 15 percent slopes	2,934	1.4
BkD	Berks shaly silt loam, 15 to 25 percent slopes	2,069	1.0
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	511	0.3
BxB	Buchanan very stony loam, 0 to 8 percent slopes	5,899	2.9
BxD	Buchanan very stony loam, 8 to 25 percent slopes	5,454	2.7
CaB	Calvin-Klinesville shaly silt loams, 3 to 8 percent slopes	2,267	1.1
CaC	Calvin-Klinesville shaly silt loams, 8 to 15 percent slopes	3,011	1.5
CaD	Calvin-Klinesville shaly silt loams, 15 to 25 percent slopes	1,346	0.7
DeB	Dekalb extremely stony sandy loam, 0 to 8 percent slopes	1,911	0.9
DeD	Dekalb extremely stony sandy loam, 8 to 25 percent slopes	2,851	1.4
DeF	Dekalb extremely stony sandy loam, steep	13,778	6.8
Dy	Dystrochrepts, bouldery	7,197	3.5
EdB	Edom complex, 3 to 8 percent slopes	9,517	4.7
EdC	Edom complex, 8 to 15 percent slopes	8,684	4.3
EdD	Edom complex, 15 to 25 percent slopes	3,639	1.8
EsB	Elliber cherty silt loam, 3 to 8 percent slopes	1,219	0.6
EsC	Elliber cherty silt loam, 8 to 15 percent slopes	766	0.4
EsD	Elliber cherty silt loam, 15 to 25 percent slopes	111	*
EtB	Elliber very cherty silt loam, 3 to 8 percent slopes	457	0.2
EtC	Elliber very cherty silt loam, 8 to 15 percent slopes	631	0.3
EtD	Elliber very cherty silt loam, 15 to 25 percent slopes	469	0.2
EtF	Elliber very cherty silt loam, 25 to 70 percent slopes	63	*
EvB	Evendale cherty silt loam, 3 to 8 percent slopes	1,252	0.6
HaB	Hagerstown silt loam, 3 to 8 percent slopes	2,689	1.3
HaC	Hagerstown silt loam, 8 to 15 percent slopes	1,688	0.8
HaD	Hagerstown silt loam, 15 to 25 percent slopes	284	0.1
HtB	Hartleton channery silt loam, 3 to 8 percent slopes	1,605	0.8
HtC	Hartleton channery silt loam, 8 to 15 percent slopes	1,472	0.7
HtD	Hartleton channery silt loam, 15 to 25 percent slopes	683	0.3
HuB	Hazleton and Clymer extremely stony sandy loams, 0 to 8 percent slopes	3,164	1.6
HuD	Hazleton and Clymer extremely stony sandy loams, 8 to 25 percent slopes	3,231	1.6
HuF	Hazleton and Clymer extremely stony sandy loams, 25 to 80 percent slopes	7,686	3.8
Hv	Holly silt loam	5,218	2.6
Hy	Holly silt loam, ponded	166	0.1
Hz	Holly silt loam, rarely flooded	1,863	0.9
KmB	Kreamer cherty silt loam, 3 to 8 percent slopes	534	0.3
LaB	Laidig gravelly loam, 3 to 8 percent slopes	101	*
LaC	Laidig gravelly loam, 8 to 15 percent slopes	409	0.2
LbB	Laidig extremely stony loam, 0 to 8 percent slopes	2,854	1.4
LdD	Laidig and Meckesville extremely stony soils, 8 to 25 percent slopes	12,822	6.3
LdF	Laidig and Meckesville extremely stony soils, steep	9,283	4.6
LnB	Leck Kill shaly silt loam, 3 to 8 percent slopes	243	0.1
LnC	Leck Kill shaly silt loam, 8 to 15 percent slopes	183	0.1
LtC	Leetonia extremely stony loamy sand, 0 to 15 percent slopes	655	0.3
Lw	Linden silt loam	1,103	0.5
MkB	Meckesville silt loam, 3 to 8 percent slopes	1,915	0.9
MkC	Meckesville silt loam, 8 to 15 percent slopes	724	0.4
MkD	Meckesville silt loam, 15 to 25 percent slopes	95	*
MoA	Monongahela silt loam, 0 to 3 percent slopes	877	0.4
MoB	Monongahela silt loam, 3 to 8 percent slopes	1,035	0.5
OpB	Opequon silty clay loam, 3 to 8 percent slopes	330	0.2
OpD	Opequon silty clay loam, 8 to 25 percent slopes	531	0.3
OpE	Opequon silty clay loam, 25 to 50 percent slopes	407	0.2
Pa	Pits	35	*
Qu	Quarries	119	*

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Ru	Rubble land	371	0.2
ShA	Shelmadine silt loam, 0 to 3 percent slopes	1,783	0.9
ShB	Shelmadine silt loam, 3 to 8 percent slopes	2,451	1.2
SmB	Shelmadine very stony silt loam, 0 to 8 percent slopes	2,009	1.0
Ug	Udifluvents and Fluvaquents, gravelly	2,685	1.3
UoB	Ungers very stony loam, 3 to 8 percent slopes	2,392	1.2
UoD	Ungers very stony loam, 8 to 25 percent slopes	3,653	1.8
UoE	Ungers very stony loam, 25 to 50 percent slopes	6,736	3.3
WaB	Washington silt loam, wet substratum, 3 to 8 percent slopes	1,349	0.7
WbA	Watson silt loam, 0 to 3 percent slopes	922	0.5
WbB	Watson silt loam, 3 to 8 percent slopes	2,324	1.1
WbC	Watson silt loam, 8 to 15 percent slopes	158	0.1
WeB	Weikert shaly silt loam, 3 to 8 percent slopes	1,687	0.8
WeC	Weikert shaly silt loam, 8 to 15 percent slopes	2,350	1.2
WeD	Weikert shaly silt loam, 15 to 25 percent slopes	2,157	1.1
WkE	Weikert and Klinesville shaly silt loams, steep	7,762	3.8
WsA	Wheeling soils, 0 to 3 percent slopes	350	0.2
WsB	Wheeling soils, 3 to 8 percent slopes	1,289	0.6
WsC	Wheeling soils, 8 to 15 percent slopes	143	*
WyB	Wyoming gravelly sandy loam, 3 to 8 percent slopes	93	*
	Total	204,000	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
AbB---- Albrights	100	20	70	40	3.5	3.0	6.5
AnA---- Allenwood	135	27	80	50	5.5	3.5	10.5
AnD---- Allenwood	110	22	65	40	4.5	3.0	8.5
AoB---- Allenwood and Washington	140	28	80	50	5.5	4.0	9.5
AoC---- Allenwood and Washington	130	26	75	45	5.0	4.0	9.0
ArA---- Alvira	95	19	60	---	---	3.0	6.0
ArB---- Alvira	95	19	60	---	---	3.0	6.0
ArC---- Alvira	90	18	55	---	---	3.0	6.0
Ba---- Barbour	110	22	75	45	4.5	4.0	8.5
Bb---- Barbour-Linden	120	24	80	45	4.5	4.0	8.5
Bc, Bd---- Basher	120	24	80	45	4.5	3.5	8.5
BeB---- Bedington	130	26	75	50	5.0	3.5	9.5
BeC---- Bedington	120	24	70	45	4.5	3.5	8.5
BkB---- Berks	80	16	60	35	3.5	3.0	6.5
BkC---- Berks	75	15	55	35	3.0	2.5	5.5
BkD---- Berks	70	14	50	30	3.0	2.5	5.5
BuB---- Buchanan	100	20	65	40	3.5	3.0	6.5
BxB, BxD---- Buchanan	---	---	---	---	---	---	---
CaB---- Calvin-Klinesville	75	15	60	30	3.0	2.5	6.0
CaC---- Calvin-Klinesville	70	14	40	30	3.0	2.5	5.5
CaD---- Calvin-Klinesville	65	13	40	25	2.5	2.5	5.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
DeB, DeD---------- Dekalb	---	---	---	---	---	---	---
DeF---------- Dekalb	---	---	---	---	---	---	---
Dy**. Dystrochrepts							
EdB---------- Edom	130	26	70	40	4.0	3.0	7.5
EdC---------- Edom	120	24	65	35	3.5	3.0	6.5
EdD---------- Edom	105	21	60	35	3.0	2.5	5.5
EsB---------- Elliber	110	22	70	40	4.0	3.0	4.5
EsC---------- Elliber	105	21	65	40	4.0	3.0	4.5
EsD---------- Elliber	100	20	65	40	3.5	2.5	4.0
EtB---------- Elliber	100	20	65	35	3.5	2.5	4.0
EtC---------- Elliber	95	19	60	35	3.5	2.5	4.0
EtD---------- Elliber	---	---	---	---	---	---	3.5
EtF---------- Elliber	---	---	---	---	---	---	---
EvB---------- Evendale	85	17	65	35	---	3.0	5.5
HaB---------- Hagerstown	135	27	80	50	5.5	3.5	10.5
HaC---------- Hagerstown	125	25	75	45	5.0	3.5	9.0
HaD---------- Hagerstown	110	22	65	35	4.0	3.0	8.0
HtB---------- Hartleton	100	20	65	35	3.5	3.0	6.5
HtC---------- Hartleton	95	19	60	35	3.0	2.5	6.0
HtD---------- Hartleton	85	17	55	30	3.0	2.0	6.0
HuB, HuD---------- Hazleton and Clymer	---	---	---	---	---	---	---
HuF---------- Hazleton and Clymer	---	---	---	---	---	---	---
Hv---------- Holly	70	14	70	---	---	3.5	4.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
Hy---------- Holly	---	---	---	---	---	---	---
Hz---------- Holly	100	20	70	---	---	3.5	4.0
KmB---------- Kreamer	90	18	65	40	3.5	3.0	6.5
LaB---------- Laidig	100	20	70	40	4.0	3.0	4.5
LaC---------- Laidig	95	19	65	35	4.0	3.0	4.5
LbB---------- Laidig	---	---	---	---	---	---	---
LdD---------- Laidig and Meckesville	---	---	---	---	---	---	---
LdF---------- Laidig and Meckesville	---	---	---	---	---	---	---
LnB---------- Leck Kill	125	25	80	50	4.5	3.0	5.0
LnC---------- Leck Kill	120	24	80	50	4.0	3.0	4.5
LtC---------- Leetonia	---	---	---	---	---	---	---
Lw---------- Linden	120	24	80	45	4.5	3.5	9.0
MkB---------- Meckesville	100	20	70	40	4.0	4.0	7.5
MkC---------- Meckesville	95	19	65	35	3.5	4.0	7.5
MkD---------- Meckesville	85	17	60	30	3.0	3.5	6.5
MoA---------- Monongahela	110	22	65	40	3.5	3.0	4.5
MoB---------- Monongahela	110	22	65	40	3.5	3.0	4.5
OpB---------- Opequon	85	17	60	25	3.5	2.5	4.5
OpD---------- Opequon	75	15	55	---	3.0	2.0	4.0
OpE---------- Opequon	---	---	---	---	---	---	---
Pa**. Pits							
Qu**. Quarries							
Ru**. Rubble land							

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Oats	Wheat	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM*
ShA---- Shelmadine	85	17	60	---	---	2.5	5.0
ShB---- Shelmadine	85	17	60	---	---	2.5	5.0
SmB---- Shelmadine	---	---	---	---	---	---	---
Ug---- Udifluvents and Fluvaquents	---	---	---	---	---	---	---
UoB, UoD, UoE---- Ungers	---	---	---	---	---	---	---
WaB---- Washington	125	25	70	40	4.0	3.0	6.5
WbA---- Watson	100	20	70	40	3.5	3.0	6.5
WbB---- Watson	100	20	70	40	3.5	3.0	6.5
WbC---- Watson	90	18	65	40	3.5	3.0	6.5
WeB---- Weikert	60	12	50	25	2.0	2.0	4.0
WeC---- Weikert	55	11	45	20	2.0	2.0	4.0
WeD---- Weikert	---	---	---	---	---	---	---
WkE---- Weikert and Klinesville	---	---	---	---	---	---	---
WsA---- Wheeling	125	25	75	45	4.5	3.5	7.0
WsB---- Wheeling	125	25	75	45	4.5	3.5	7.0
WsC---- Wheeling	115	23	70	40	4.5	3.0	6.5
WyB---- Wyoming	90	18	75	45	4.0	3.0	6.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	2,230	---	---	---
II	38,118	35,457	2,661	---
III	33,447	24,037	8,860	550
IV	23,050	12,967	9,452	631
V	166	---	166	---
VI	17,717	3,503	---	14,214
VII	78,865	8,169	---	70,696
VIII	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AbB---- Albrights	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Red pine, eastern white pine, Japanese larch, Norway spruce, white spruce.
						Yellow-poplar-------	75	
						White ash----------	---	
						Red maple----------	---	
AnA---- Allenwood	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, yellow-poplar, Norway spruce, red pine.
						Yellow-poplar-------	85	
AnD---- Allenwood	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, yellow-poplar, Norway spruce, red pine.
						Yellow-poplar-------	85	
AoB*, AoC*: Allenwood----	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, yellow-poplar, Norway spruce, Virginia pine.
						Yellow-poplar-------	85	
Washington----	1o	Slight	Slight	Slight	Slight	Northern red oak----	85	Eastern white pine, Japanese larch, black walnut, yellow-poplar, Norway spruce.
						Yellow-poplar-------	95	
ArA, ArB---- Alvira	3w	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch, white spruce.
						Yellow-poplar-------	75	
ArC---- Alvira	3w	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch, white spruce.
						Yellow-poplar-------	75	
Ba*---- Barbour	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, Norway spruce, black walnut.
						Northern red oak----	80	
Bb*: Barbour----	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, Norway spruce, black walnut.
						Northern red oak----	80	
Linden----	1o	Slight	Slight	Slight	Slight	Northern red oak----	90	Yellow-poplar, black walnut, black cherry, red pine, Japanese larch, Norway spruce, eastern white pine.
						White ash----------	90	
						Sugar maple---------	90	
						Black cherry--------	90	
						Black walnut--------	90	
						Eastern white pine--	90	
						Yellow-poplar-------	100	
Bc*, Bd*---- Basher	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, black walnut, Norway spruce, Japanese larch.
						Northern red oak----	80	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
BeB, BeC---------- Bedington	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	75 85	Black walnut, yellow-poplar, eastern white pine, Japanese larch, Norway spruce, Austrian pine.
BkB, BkC---------- Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
BkD---------- Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak---- Black oak---------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
BuB---------- Buchanan	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	66 91	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, white spruce.
BxB---------- Buchanan	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	66 91	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, white spruce.
BxD---------- Buchanan	3r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	66 91	Northern red oak, yellow-poplar, sugar maple, eastern white pine, Japanese larch, white spruce.
CaB*, CaC*: Calvin----------	3f	Slight	Slight	Moderate	Slight	Yellow-poplar------- Northern red oak----	71 71	Eastern white pine, red pine, Austrian pine.
Klinesville-------	4d	Slight	Slight	Moderate	Moderate	Northern red oak---- Virginia pine-------	60 60	Virginia pine, eastern white pine, red pine, pitch pine.
CaD*: Calvin----------	3f	Slight	Moderate	Moderate	Slight	Yellow-poplar------- Northern red oak----	80 71	Eastern white pine, red pine, Austrian pine.
Klinesville-------	4d	Slight	Moderate	Moderate	Moderate	Northern red oak---- Virginia pine-------	60 60	Virginia pine, eastern white pine, red pine, pitch pine.
DeB---------- Dekalb	4x	Slight	Moderate	Moderate	Slight	Northern red oak----	62	Eastern white pine, red pine.
DeD---------- Dekalb	4x	Slight	Moderate	Moderate	Slight	Northern red oak----	62	Eastern white pine, red pine.
DeF---------- Dekalb	4x	Moderate	Severe	Moderate	Slight	Northern red oak----	62	Eastern white pine, red pine.
EdB*, EdC*--------- Edom	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, Norway spruce, red pine.
EdD*---------- Edom	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, Norway spruce, red pine.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
EsB, EsC---------- Elliber	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
						Yellow-poplar-------	90	
EsD---------- Elliber	2r	Slight	Moderate	Slight	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
						Yellow-poplar-------	90	
EtB, EtC---------- Elliber	2f	Slight	Slight	Moderate	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
						Yellow-poplar-------	90	
EtD---------- Elliber	2f	Slight	Moderate	Moderate	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
						Yellow-poplar-------	90	
EtF---------- Elliber	2f	Moderate	Severe	Moderate	Slight	Northern red oak----	80	Eastern white pine, Japanese larch, Norway spruce, black walnut, yellow-poplar, black locust.
						Yellow-poplar-------	90	
EvB---------- Evendale	2w	Slight	Moderate	Moderate	Moderate	Northern red oak----	80	Eastern white pine, yellow-poplar, Norway spruce.
						Yellow-poplar-------	90	
HaB, HaC---------- Hagerstown	1c	Slight	Moderate	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HaD---------- Hagerstown	1c	Moderate	Severe	Slight	Slight	Northern red oak----	85	Black walnut, yellow-poplar, eastern white pine, Norway spruce.
						Yellow-poplar-------	95	
HtB, HtC---------- Hartleton	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Chestnut oak--------	70	
						Eastern white pine--	70	
						Virginia pine-------	70	
HtD---------- Hartleton	3r	Slight	Moderate	Slight	Slight	Northern red oak----	70	Virginia pine, eastern white pine, Japanese larch, Norway spruce, red pine.
						Chestnut oak--------	70	
						Eastern white pine--	70	
						Virginia pine-------	70	
HuB*: Hazleton----------	3x	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	
Clymer----------	2x	Slight	Moderate	Slight	Slight	Northern red oak----	77	Eastern white pine, red pine, black cherry yellow-poplar.
						Yellow-poplar-------	90	
						Eastern white pine--	90	
HuD*: Hazleton----------	3x	Slight	Moderate	Slight	Slight	Northern red oak----	70	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow-poplar-------	80	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
HuD*:								
Clymer	2x	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	83 95 ---	Eastern white pine, black cherry, yellow-poplar, red pine.
HuF*:								
Hazleton	3x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar	70 80	Japanese larch, eastern white pine, Norway spruce, Austrian pine, black cherry.
Clymer	2x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	83 95 ---	Eastern white pine, black cherry, yellow-poplar, Virginia pine.
Hv Holly	2w	Slight	Severe	Severe	Moderate	Pin oak Red maple Black cherry	90 --- ---	Red maple, white spruce, American sycamore.
Hy Holly	4w	Slight	Severe	Severe	Severe	Pin oak Red maple	66 ---	
Hz Holly	2w	Slight	Severe	Severe	Moderate	Pin oak Red maple Black cherry	90 --- ---	Red maple, white spruce. American sycamore.
KmB Kreamer	3w	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, yellow-poplar, Norway spruce, Japanese larch.
LaB, LaC Laidig	3o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	69 75 80	Eastern white pine, yellow-poplar, black walnut, red pine, Norway spruce, black walnut.
LbB Laidig	3x	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	69 75 80	Eastern white pine, yellow-poplar, black walnut, red pine, Norway spruce, black locust.
LdD*:								
Laidig	3x	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	69 75 80	Eastern white pine, yellow-poplar, black walnut, red pine, Norway spruce, black locust.
Meckesville	2x	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
LdF*:								
Laidig	3x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine	69 75 80	Eastern white pine, yellow-poplar, black walnut, red pine, Norway spruce, black locust.
Meckesville	2x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar	88 90	Eastern white pine, yellow-poplar, black walnut, red pine, Norway spruce.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
LnB, LnC---------- Leck Kill	3o	Slight	Slight	Slight	Slight	Northern red oak----	68	Eastern white pine, red pine.
LtC---------- Leetonia	5x	Slight	Severe	Severe	Slight	Northern red oak---- Virginia pine-------	50 50	Virginia pine, pitch pine.
Lw---------- Linden	1o	Slight	Slight	Slight	Slight	Northern red oak---- White ash---------- Sugar maple--------- Black cherry-------- Black walnut-------- Eastern white pine-- Yellow-poplar-------	90 90 90 90 90 90 100	Yellow-poplar, black walnut, black cherry, red pine, Japanese larch, Norway spruce, eastern white pine.
MkB, MkC---------- Meckesville	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
MkD---------- Meckesville	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, Japanese larch, yellow-poplar, black cherry, Norway spruce.
MoA, MoB---------- Monongahela	3o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Eastern white pine-- Virginia pine------- White ash---------- Black walnut--------	70 85 72 66 --- ---	Eastern white pine.
OpB---------- Opequon	3c	Moderate	Moderate	Severe	Moderate	Northern red oak---- Yellow-poplar-------	70 80	Austrian pine, eastern white pine, Japanese larch.
OpD---------- Opequon	3c	Severe	Severe	Severe	Moderate	Northern red oak---- Yellow-poplar-------	70 80	Austrian pine, eastern white pine, Japanese larch.
OpE---------- Opequon	3c	Severe	Severe	Severe	Moderate	Northern red oak---- Yellow-poplar-------	70 80	Austrian pine, eastern white pine, Japanese larch.
ShA, ShB---------- Shelmadine	3w	Slight	Severe	Severe	Moderate	Northern red oak---- Black cherry--------	70 70	Eastern white pine, red maple, Norway spruce.
SmB---------- Shelmadine	3w	Slight	Severe	Severe	Moderate	Northern red oak---- Black cherry--------	70 70	Eastern white pine, red maple, Norway spruce.
UoB, UoD---------- Ungers	4o	Slight	Slight	Slight	Slight	Northern red oak---- Virginia pine-------	67 65	Eastern white pine, Virginia pine, Japanese larch, Norway spruce.
UoE---------- Ungers	3r	Moderate	Severe	Slight	Slight	Northern red oak---- Virginia pine-------	67 65	Eastern white pine, Virginia pine, Japanese larch, Norway spruce.
WaB---------- Washington	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	75 85	Eastern white pine, yellow-poplar, Japanese larch, Norway spruce.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
WbA, WbB, WbC---- Watson	3o	Slight	Slight	Slight	Slight	Northern red oak----	70	Eastern white pine, yellow-poplar, Japanese larch, Norway spruce, black cherry.
						Sugar maple----------	70	
						Yellow-poplar--------	80	
WeB, WeC---------- Weikert	4d	Slight	Slight	Severe	Moderate	Northern red oak----	59	Virginia pine, red pine, eastern white pine.
						Virginia pine-------	56	
WeD---------- Weikert	4d	Slight	Moderate	Severe	Moderate	Northern red oak----	64	Eastern white pine, red pine, Virginia pine.
						Virginia pine-------	60	
WkE*: (North aspect) Weikert---------	4d	Moderate	Severe	Severe	Moderate	Northern red oak----	64	Eastern white pine, red pine, Virginia pine.
						Virginia pine-------	60	
Klinesville-------	4d	Moderate	Severe	Moderate	Moderate	Northern red oak----	60	Virginia pine, eastern white pine, red pine, pitch pine.
						Virginia pine-------	60	
WkE*: (South aspect) Weikert---------	5d	Moderate	Severe	Severe	Moderate	Northern red oak----	50	Virginia pine, red pine, eastern white pine.
						Virginia pine-------	50	
Klinesville-------	5d	Moderate	Severe	Severe	Moderate	Northern red oak----	50	Virginia pine, eastern white pine, red pine, pitch pine.
						Virginia pine-------	50	
WsA*, WsB*, WsC*--- Wheeling	2o	Slight	Slight	Slight	Slight	Northern red oak----	80	Eastern white pine, yellow-poplar, black walnut.
						Yellow-poplar--------	90	
WyB---------- Wyoming	4f	Slight	Slight	Severe	Slight	Northern red oak----	55	Eastern white pine, red pine, Austrian pine.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AbB Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AnA Allenwood	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
AnD Allenwood	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
AoB*: Allenwood	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Washington	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
AoC*: Allenwood	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
Washington	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
ArA, ArB Alvira	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
ArC Alvira	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
Ba* Barbour	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Bb*: Barbour	Severe: flooding.	Slight	Slight	Slight	Slight.
Linden	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Slight.
Bc* Basher	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Bd* Basher	Severe: flooding, wetness.	Moderate: wetness, flooding.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
BeB Bedington	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
BeC Bedington	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
BkB Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: small stones.
BkC Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Slight	Severe: small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BkD Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope.	Severe: slope, small stones.
BuB Buchanan	Moderate: wetness, small stones.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
BxB Buchanan	Moderate: wetness, large stones.	Moderate: wetness, large stones.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: large stones, wetness.
BxD Buchanan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: wetness, slope.	Severe: large stones, slope.
CaB*: Calvin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: large stones, thin layer.
Klinesville	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: small stones, thin layer.
CaC*: Calvin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: large stones, slope, thin layer.
Klinesville	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Slight	Severe: small stones, thin layer.
CaD*: Calvin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Klinesville	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.	Severe: small stones, slope, thin layer.
DeB Dekalb	Severe: large stones, small stones.	Severe: small stones, large stones.	Severe: small stones, large stones.	Moderate: large stones.	Severe: small stones.
DeD Dekalb	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope, small stones.
DeF Dekalb	Severe: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, small stones.
Dy*. Dystrochrepts					
EdB* Edom	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: small stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EdC* Edom	Moderate: small stones, slope, percs slowly.	Moderate: small stones, slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
EdD* Edom	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
EsB Elliber	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
EsC Elliber	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight: small stones.	Severe: small stones, droughty.
EsD Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, droughty, slope.
EtB Elliber	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
EtC Elliber	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
EtD Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
EtF Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
EvB Evendale	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
HaB Hagerstown	Slight	Slight	Moderate: slope.	Slight	Slight.
HaC Hagerstown	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
HaD Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
HtB Hartleton	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: large stones.
HtC Hartleton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: large stones, slope.
HtD Hartleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope. slope.
HuB*: Hazleton	Severe: large stones.	Severe: large stones.	Severe: small stones, large stones.	Moderate: large stones.	Severe: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HuB*: Clymer	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Severe: large stones.	Moderate: large stones.
HuD*: Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.
Clymer	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope, large stones.
HuF*: Hazleton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, small stones, large stones.	Severe: slope.	Severe: slope, large stones.
Clymer	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope, large stones.
Hv Holly	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Hy Holly	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Hz Holly	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
KmB Kreamer	Moderate: small stones, wetness, percs slowly.	Moderate: small stones, wetness, percs slowly.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness.
LaB Laidig	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: small stones.
LaC Laidig	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
LbB Laidig	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Slight	Moderate: large stones, small stones.
LdD*: Laid	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Slight	Moderate: large stones, small stones, slope.
Meckesville	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight	Moderate: small stones, large stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LdF*:					
Laidig	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope.
Meckesville	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
LnB Leck Kill	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
LnC Leck Kill	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
LtC Leetonia	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: slope, large stones, small stones.	Moderate: large stones.	Severe: small stones, large stones, droughty.
Lw Linden	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
MkB Meckesville	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
MkC Meckesville	Moderate: percs slowly, slope.	Moderate: percs slowly, slope.	Severe: slope.	Slight	Moderate: slope.
MkD Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MoA Monongahela	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
MoB Monongahela	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
OpB Opequon	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: erodes easily.	Severe: thin layer.
OpD Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, thin layer.
OpE Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, thin layer.
Pa*. Pits					
Qu*. Quarries					
Ru*. Rubble land					
ShA, ShB Shelmadine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SmB---------- Shelmadine	Severe: wetness.	Severe: wetness.	Severe: wetness, large stones.	Severe: wetness.	Severe: wetness.
Ug*: Udifluvents.					
Ug*: Fluvaquents.					
UoB---------- Ungers	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: small stones.
UoD---------- Ungers	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight----------	Moderate: small stones, slope.
UoE---------- Ungers	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
WaB---------- Washington	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
WbA---------- Watson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
WbB---------- Watson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, percs slowly.	Moderate: wetness.	Moderate: wetness.
WbC---------- Watson	Moderate: wetness, slope, percs slowly.	Moderate: wetness, slope, percs slowly.	Severe: slope.	Moderate: wetness, erodes easily.	Moderate: wetness, slope.
WeB---------- Weikert	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: depth to rock, small stones.	Slight----------	Severe: thin layer, small stones.
WeC---------- Weikert	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Slight----------	Severe: thin layer, small stones.
WeD---------- Weikert	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Moderate: slope.	Severe: slope, thin layer, small stones.
WkE*: Weikert----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, thin layer, small stones.
Klinesville----------	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: small stones, slope, thin layer.
WsA*---------- Wheeling	Slight----------	Slight----------	Slight----------	Slight----------	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WsB* Wheeling	Slight	Slight	Moderate: slope.	Slight	Slight.
WsC* Wheeling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WyB Wyoming	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AbB---- Albrights	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnA---- Allenwood	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AnD---- Allenwood	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AoB*:										
Allenwood----	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Washington----	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AoC*:										
Allenwood----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Washington----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ArA---- Alvira	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
ArB---- Alvira	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ArC---- Alvira	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ba*---- Barbour	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Bb*:										
Barbour----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Linden----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bc*---- Basher	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bd*:										
Basher----	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
BeB---- Bedington	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BeC---- Bedington	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BkB---- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BkC---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BkD---- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BuB---- Buchanan	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BxB---- Buchanan	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
BxD---- Buchanan	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CaB*: Calvin----	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Klinesville----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CaC*: Calvin----	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Klinesville----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
CaD*: Calvin----	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Klinesville----	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
DeB---- Dekalb	Very poor.	Very poor.	Good	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
DeD, DeF---- Dekalb	Very poor.	Very poor.	Good	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Dy*. Dystrochrepts										
EdB*---- Edom	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EdC*---- Edom	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EdD*---- Edom	Poor	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EsB---- Elliber	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EsC---- Elliber	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EsD---- Elliber	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EtB---- Elliber	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EtC---- Elliber	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EtD---- Elliber	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
EtF---- Elliber	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
EvB--Evendale	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HaB--Hagerstown	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HaC--Hagerstown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HaD--Hagerstown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HtB--Hartleton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HtC--Hartleton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HtD--Hartleton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HuB*:										
Hazleton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Clymer	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
HuD*:										
Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Clymer	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
HuF*:										
Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Clymer	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hv--Holly	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
Hy--Holly	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Hz--Holly	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
KmB--Kreamer	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaB--Laidig	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LaC--Laidig	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LbB--Laidig	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
LdD*:										
Laidig	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland Wildlife
LdD*:										
Meckesville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
LdF*:										
Laidig	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Meckesville	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
LnB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Leck Kill										
LnC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Leck Kill										
LtC	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Leetonia										
Lw	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Linden										
MkB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Meckesville										
MkC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Meckesville										
MkD	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Meckesville										
MoA	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Monongahela										
MoB	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Monongahela										
OpB, OpD	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Opequon										
OpE	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Opequon										
Pa*.										
Pits										
Qu*.										
Quarries										
Ru*.										
Rubble land										
ShA	Poor	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
Shelmadine										
ShB	Poor	Fair	Good	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
Shelmadine										
SmB	Very poor.	Very poor.	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Shelmadine										
Ug*:										
Udifluvents.										
Fluvaquents.										

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
UoB--Ungers	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
UoD--Ungers	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
UoE--Ungers	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
WaB--Washington	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WbA--Watson	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WbB--Watson	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WbC--Watson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WeB, WeC, WeD--Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
WkE*:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Klinesville	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
WsA*--Wheeling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WsB*--Wheeling	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WsC*--Wheeling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WyB--Wyoming	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AbB---- Albrights	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
AnA---- Allenwood	Moderate: too clayey.	Slight----	Slight----	Slight----	Moderate: low strength, frost action.	Moderate: small stones.
AnD---- Allenwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
AoB*: Allenwood----	Moderate: too clayey.	Slight----	Slight----	Moderate: slope.	Moderate: low strength, frost action.	Moderate: small stones.
Washington----	Slight----	Slight----	Slight----	Moderate: slope.	Moderate: frost action.	Slight.
AoC*: Allenwood----	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: small stones, slope.
Washington----	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
ArA, ArB---- Alvira	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
ArC---- Alvira	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: frost action, wetness.	Severe: wetness.
Ba*---- Barbour	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Bb*: Barbour----	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
Linden----	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
Bc*---- Basher	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Bd*---- Basher	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
BeB---- Bedington	Slight----	Slight----	Slight----	Moderate: slope.	Moderate: frost action.	Slight.
BeC---- Bedington	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BkB---- Berks	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Severe: small stones.
BkC---- Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Severe: small stones.
BkD---- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
BuB---- Buchanan	Severe: wetness.	Moderate: wetness.	Severe: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness.	Moderate: small stones, wetness.
BxB---- Buchanan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Severe: large stones.
BxD---- Buchanan	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
CaB*:						
Calvin----	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: large stones, thin layer.
Klinesville----	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: small stones, thin layer.
CaC*:						
Calvin----	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope, thin layer.
Klinesville----	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Severe: small stones, thin layer.
CaD*:						
Calvin----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Klinesville----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
DeB---- Dekalb	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Moderate: depth to rock, large stones.	Severe: small stones.
DeD, DeF---- Dekalb	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Dy*. Dystrochrepts						
EdB*---- Edom	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
EdC*---------- Edom	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
EdD*---------- Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
EsB---------- Elliber	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: small stones, droughty.
EsC---------- Elliber	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: small stones, droughty.
EsD---------- Elliber	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
EtB---------- Elliber	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: small stones, droughty.
EtC---------- Elliber	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: small stones, droughty.
EtD, EtF---------- Elliber	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
EvB---------- Evendale	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
HaB---------- Hagerstown	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
HaC---------- Hagerstown	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
HaD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HtB---------- Hartleton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
HtC---------- Hartleton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
HtD---------- Hartleton	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
HuB*: Hazleton----------	Moderate: depth to rock, large stones.	Moderate: large stones.	Moderate: large stones, depth to rock.	Moderate: slope, large stones.	Moderate: frost action, large stones.	Severe: large stones.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HuB*: Clymer	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: droughty, large stones.
HuD*, HuF*: Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
Clymer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hv Holly	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
Hy Holly	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.
Hz Holly	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, frost action.	Severe: wetness.
KmB Kreamer	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action, low strength.	Moderate: small stones, wetness.
LaB Laidig	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: small stones.
LaC Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: small stones, slope.
LbB Laidig	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: frost action, low strength.	Moderate: large stones, small stones.
LdD*: Laidig	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: large stones, small stones, slope.
Meckesville	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, large stones, slope.
LdF*: Laidig	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LnB Leck Kill	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: small stones.
LnC Leck Kill	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LtC---------- Leetonia	Severe: cutbanks cave.	Moderate: slope. large stones.	Moderate: depth to rock, slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: small stones, large stones, droughty.
Lw---------- Linden	Moderate: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
MkB---------- Meckesville	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Slight.
MkC---------- Meckesville	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
MkD---------- Meckesville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MoA---------- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
MoB---------- Monongahela	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
OpB---------- Opequon	Severe: depth to rock.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: depth to rock, low strength, shrink-swell.	Severe: thin layer.
OpD, OpE---------- Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, shrink-swell.	Severe: slope, depth to rock, low strength.	Severe: slope, thin layer.
Pa*. Pits						
Qu*. Quarries						
Ru*. Rubble land						
ShA, ShB, SmB----- Shelmadine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Ug*: Udifluvents. Fluvaquents.						
UoB---------- Ungers	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, large stones.
UoD---------- Ungers	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope, large stones.
UoE---------- Ungers	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WaB--- Washington	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness.
WbA--- Watson	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
WbB--- Watson	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: low strength, wetness, frost action.	Moderate: wetness.
WbC--- Watson	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.
WeB--- Weikert	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Severe: thin layer, small stones.
WeC--- Weikert	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Severe: thin layer, small stones.
WeD--- Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer, small stones.
WkE*: Weikert---	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, thin layer, small stones.
Klinesville---	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
WsA*--- Wheeling	Slight---	Slight---	Slight---	Slight---	Moderate: frost action, low strength.	Slight.
WsB*--- Wheeling	Slight---	Slight---	Slight---	Moderate: slope.	Moderate: frost action, low strength.	Slight.
WsC*--- Wheeling	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: frost action, low strength, slope.	Moderate: slope.
WyB--- Wyoming	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Slight---	Severe: small stones, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AbB Albrights	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AnA Allenwood	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
AnD Allenwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Fair: too clayey, small stones.
AoB*: Allenwood	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, small stones.
Washington	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, small stones.
AoC*: Allenwood	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey, slope.	Moderate: slope.	Fair: too clayey, small stones, slope.
Washington	Moderate: slope, percs slowly.	Severe: slope, seepage.	Severe: seepage.	Moderate: slope.	Fair: slope, too clayey, small stones.
ArA Alvira	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
ArB Alvira	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
ArC Alvira	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ba* Barbour	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones.
Bb*: Barbour	Severe: poor filter.	Severe: flooding, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Linden	Moderate: wetness.	Severe: flooding, seepage.	Severe: wetness, seepage.	Severe: seepage.	Poor: thin layer.
Bc*, Bd* Basher	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Poor: wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BeB---------- Bedington	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
BeC---------- Bedington	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
BkB---------- Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim, thin layer.
BkC---------- Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim, thin layer.
BkD---------- Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope, depth to rock.	Poor: small stones, slope, area reclaim.
BuB---------- Buchanan	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
BxB---------- Buchanan	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness, large stones.
BxD---------- Buchanan	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
CaB*:					
Calvin----------	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
Klinesvillo--------	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, small stones.
CaC*:					
Calvin----------	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones, thin layer.
Klinesville--------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, small stones.
CaD*:					
Calvin----------	Severe: depth to rock, slope.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Klinesville--------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DeB Dekalb	Severe: depth to rock, poor filter.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim, thin layer.
DeD, DeF Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
Dy*. Dystrochrepts					
EdB* Edom	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
EdC* Edom	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
EdD* Edom	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
EsB Elliber	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EsC Elliber	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EsD Elliber	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
EtB Elliber	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EtC Elliber	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
EtD, EtF Elliber	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
EvB Evendale	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey, depth to rock.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
HaB Hagerstown	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
HaC Hagerstown	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HaD---------- Hagerstown	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HtB---------- Hartleton	Severe: large stones.	Severe: seepage, large stones.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: large stones.
HtC---------- Hartleton	Severe: large stones.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: large stones.
HtD---------- Hartleton	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
HuB*: Hazleton----------	Severe: poor filter.	Severe: seepage, large stones.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
Clymer----------	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Poor: small stones.
HuD*, HuF*: Hazleton----------	Severe: poor filter, slope.	Severe: slope, seepage, large stones.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
Clymer----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Hv---------- Holly	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, seepage, too sandy.
Hy---------- Holly	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Hz---------- Holly	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness, seepage, too sandy.
KmB---------- Kreamer	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey.
LaB---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Fair: small stones, wetness.
LaC---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage, slope.	Moderate: slope, wetness.	Severe: seepage.	Fair: slope, small stones, wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LbB---------- Laidig	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness, large stones.	Severe: seepage.	Fair: small stones, wetness.
LdD*:					
Laidig----------	Severe: percs slowly, wetness.	Severe: seepage, slope.	Moderate: wetness, slope.	Severe: seepage.	Fair: slope.
Meckesville--------	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, thin layer.
LdF*:					
Laidig----------	Severe: slope, percs slowly, wetness.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
Meckesville--------	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
LnB---------- Leck Kill	Moderate: percs slowly, depth to rock.	Severe: seepage.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
LnC---------- Leck Kill	Moderate: percs slowly, slope, depth to rock.	Severe: seepage, slope.	Severe: seepage, depth to rock.	Severe: seepage.	Poor: small stones.
LtC---------- Leetonia	Severe: poor filter.	Severe: slope, seepage, large stones.	Severe: depth to rock, seepage, large stones.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Lw---------- Linden	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage.	Severe: wetness, flooding, seepage.	Severe: seepage, flooding.	Fair: thin layer.
MkB---------- Meckesville	Severe: wetness, percs slowly.	Moderate: slope, seepage.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: small stones.
MkC---------- Meckesville	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: small stones, slope.
MkD---------- Meckesville	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope, thin layer.
MoA, MoB---------- Monongahela	Severe: percs slowly, wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
OpB---------- Opequon	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OpD, OpE---------- Opequon	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, slope.
Pa*. Pits					
Qu*. Quarries					
Ru*. Rubble land					
ShA---------- Shelmadine	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
ShB, SmB---------- Shelmadine	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ug*: Udifluvents.					
Fluvaquents.					
UoB---------- Ungers	Moderate: depth to rock, percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Fair: small stones.
UoD---------- Ungers	Severe: slope. percs slowly.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Fair: slope, small stones.
UoE---------- Ungers	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.
WaB---------- Washington	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
WbA---------- Watson	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Moderate: wetness.	Fair: small stones.
WbB---------- Watson	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
WbC---------- Watson	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope.
WeB---------- Weikert	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, seepage, small stones.
WeC---------- Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WeD---------- Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.
WkE*: Weikert----------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim, seepage.
Klinesville--------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, small stones.
WsA*, WsB*---------- Wheeling	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Slight----------	Fair: thin layer.
WsC*---------- Wheeling	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: slope, thin layer.
WyB---------- Wyoming	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AbB---------- Albrights	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
AnA---------- Allenwood	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
AnD---------- Allenwood	Fair: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
AoB*:				
Allenwood----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Washington----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
AoC*:				
Allenwood----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Washington----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones, too clayey.
ArA, ArB, ArC--------- Alvira	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
Ba*---------- Barbour	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Bb*:				
Barbour----------	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Linden----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Bc*, Bd*---------- Basher	Fair: wetness.	Probable----------	Probable----------	Fair: small stones, area reclaim.
BeB, BeC---------- Bedington	Fair: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BkB, BkC---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BkD---------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BuB, BxB---------- Buchanan	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
BxD---------- Buchanan	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
CaB*, CaC*:				
Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Klinesville----------	Poor: area reclaim, thin layer.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
CaD*:				
Calvin----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Klinesville----------	Poor: area reclaim, thin layer.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
DeB---------- Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
DeD---------- Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
DeF---------- Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
Dy*. Dystrochrepts				
EdB*, EdC*---------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EdD*---------- Edom	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EsB, EsC---------- Elliber	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EsD---------- Elliber	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EtB, EtC---------- Elliber	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
EtD---------- Elliber	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EtF---------- Elliber	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
EvB---------- Evendale	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
HaB, HaC---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
HaD---------- Hagerstown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
HtB, HtC---------- Hartleton	Fair: large stones, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
HtD---------- Hartleton	Poor: large stones, area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
HuB*: Hazleton----------	Fair: area reclaim, thin layer, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Clymer----------	Fair: area reclaim, thin layer, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
HuD*: Hazleton----------	Fair: slope, area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clymer----------	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HuF*: Hazleton----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Clymer----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Hv---------- Holly	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Hy---------- Holly	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hz Holly	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
KmB Kreamer	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LaB, LaC, LbB Laidig	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
LdD*: Laidig	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Meckesville	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LdF*: Laidig	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Meckesville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LnB, LnC Leck Kill	Fair: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LtC Leetonia	Fair: area reclaim, large stones.	Probable	Probable	Poor: small stones, area reclaim.
Lw Linden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
MkB, MkC Meckesville	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MkD Meckesville	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
MoA, MoB Monongahela	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
OpB, OpD Opequon	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
OpE Opequon	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Pa*. Pits				
Qu*. Quarries				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ru*. Rubble land				
ShA, ShB Shelmadine	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, area reclaim.
SmB Shelmadine	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
Ug*: Udifluvents.				
Fluvaquents.				
UoB, UoD Ungers	Fair: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
UoE Ungers	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, large stones.
WaB Washington	Fair: wetness, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
WbA, WbB, WbC Watson	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WeB, WeC Weikert	Poor: area reclaim, thin layer.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, area reclaim.
WeD Weikert	Poor: area reclaim, thin layer.	Improbable: small stones.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
WkE*: Weikert	Poor: slope, area reclaim, thin layer.	Improbable: small stones.	Improbable: thin layer.	Poor: slope, small stones, area reclaim.
Klinesville	Poor: area reclaim, slope, thin layer.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
WsA*, WsB* Wheeling	Fair: low strength.	Improbable: thin layer.	Improbable: thin layer.	Fair: small stones.
WsC* Wheeling	Fair: low strength.	Improbable: thin layer.	Improabable: thin layer.	Fair: small stones, slope.
WyB Wyoming	Good	Probable	Probable	Poor: small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AbB---- Albrights	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope----	Wetness, rooting depth.	Wetness, rooting depth.
AnA---- Allenwood	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
AnD---- Allenwood	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----	Slope.
AoB*:						
Allenwood----	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
Washington----	Severe: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
AoC*:						
Allenwood----	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope----	Slope.
Washington----	Severe: slope, seepage.	Moderate: piping.	Severe: no water.	Deep to water	Slope----	Slope.
ArA---- Alvira	Slight----	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Percs slowly, wetness, rooting depth.
ArB---- Alvira	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, percs slowly.	Percs slowly, wetness, rooting depth.
ArC---- Alvira	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, rooting depth, slope.
Ba*---- Barbour	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy----	Favorable.
Bb*:						
Barbour----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy----	Favorable.
Linden----	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Deep to water	Erodes easily	Erodes easily.
Bc*, Bd*---- Basher	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Flooding, frost action.	Wetness----	Wetness.
BeB---- Bedington	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable----	Favorable.
BeC---- Bedington	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----	Slope.
BkB---- Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock.	Droughty, depth to rock.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
BkC, BkD---------- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope.	Droughty, depth to rock, slope.
BuB---------- Buchanan	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Wetness, rooting depth.	Rooting depth, percs slowly.
BxB---------- Buchanan	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Large stones, wetness, rooting depth.	Large stones, rooting depth, percs slowly.
BxD---------- Buchanan	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Large stones, rooting depth, slope.
CaB*:						
Calvin----------	Severe: seepage.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock	Depth to rock, droughty.
Klinesville------	Severe: depth to rock.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
CaC*, CaD*:						
Calvin----------	Severe: seepage, slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Depth to rock, slope, droughty.
Klinesville------	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
DeB---------- Dekalb	Severe: seepage.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Depth to rock, large stones.	Large stones, droughty, depth to rock.
DeD, DeF---------- Dekalb	Severe: seepage, slope.	Severe: piping, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, large stones, droughty.
Dy*. Dystrochrepts						
EdB*---------- Edom	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Favorable------	Favorable.
EdC*, EdD*-------- Edom	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope----------	Slope.
EsB---------- Elliber	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
EsC, EsD---------- Elliber	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
EtB---------- Elliber	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
EtC, EtD, EtF----- Elliber	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
EvB---------- Evendale	Moderate: slope.	Severe: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Percs slowly, wetness.	Percs slowly, wetness.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
HaB---------- Hagerstown	Moderate: seepage, depth to rock, slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Favorable------	Favorable.
HaC, HaD---------- Hagerstown	Severe: slope.	Moderate: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope----------	Slope.
HtB---------- Hartleton	Severe: seepage.	Severe: piping, large stones.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
HtC, HtD---------- Hartleton	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
HuB*: Hazleton---------	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
Clymer----------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones.
HuD*, HuF*: Hazleton---------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, slope.	Large stones, slope, droughty.
Clymer----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Hv---------- Holly	Severe: seepage.	Severe: piping, wetness, seepage.	Severe: slow refill, cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, too sandy.	Wetness.
Hy---------- Holly	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, flooding, frost action.	Ponding, too sandy.	Wetness.
Hz---------- Holly	Severe: seepage.	Severe: piping, wetness, seepage.	Severe: slow refill, cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Wetness.
KmB---------- Kreamer	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Percs slowly.
LaB---------- Laidig	Severe: seepage.	Severe: piping.	Severe: no water.	Slope----------	Rooting depth	Rooting depth.
LaC---------- Laidig	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Slope rooting depth.	Slope, rooting depth.
LbB---------- Laidig	Severe: seepage.	Severe: piping.	Severe: no water.	Slope----------	Large stones, rooting depth.	Large stones, rooting depth.
LdD*, LdF*: Laidig----------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Slope, large stones, rooting depth.	Large stones, slope, rooting depth.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
LdD*, LdF*: Meckesville	Severe: slope.	Severe: piping.	Severe: no water.	Slope	Slope, large stones, rooting depth.	Large stones, slope, rooting depth.
LnB---- Leck Kill	Severe: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Favorable	Favorable.
LnC---- Leck Kill	Severe: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope	Slope.
LtC---- Leetonia	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
Lw---- Linden	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Deep to water	Erodes easily	Erodes easily.
MkB---- Meckesville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Slope	Wetness, rooting depth.	Rooting depth.
MkC, MkD---- Meckesville	Severe: slope.	Severe: piping.	Severe: no water.	Slope	Slope, wetness, rooting depth.	Slope, rooting depth.
MoA---- Monongahela	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
MoB---- Monongahela	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth, percs slowly.
OpB---- Opequon	Severe: depth to rock.	Severe: hard to pack, thin layer.	Severe: no water.	Deep to water	Depth to rock, erodes easily.	Erodes easily, depth to rock, droughty.
OpD, OpE---- Opequon	Severe: depth to rock, slope.	Severe: hard to pack, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Pa*. Pits						
Qu*. Quarries						
Ru*. Rubble land						
ShA---- Shelmadine	Slight	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, rooting depth, percs slowly.	Percs slowly, wetness, rooting depth.
ShB---- Shelmadine	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, percs slowly.	Percs slowly, wetness, rooting depth.
SmB---- Shelmadine	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth, percs slowly.	Percs slowly, rooting depth, slope.
Ug*: Udifluvents.						
Fluvaquents.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
UoB---------- Ungers	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
UoD, UoE---------- Ungers	Moderate: seepage, depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
WaB---------- Washington	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Slope----------	Wetness--------	Favorable.
WbA---------- Watson	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly---	Wetness, rooting depth, erodes easily.	Rooting depth, percs slowly, erodes easily.
WbB---------- Watson	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, rooting depth, erodes easily.	Rooting depth, percs slowly, erodes easily.
WbC---------- Watson	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, slope.	Slope, wetness, rooting depth.	Slope, rooting depth, percs slowly.
WeB---------- Weikert	Severe: depth to rock, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
WeC, WeD---------- Weikert	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
WkE*: Weikert----------	Severe: depth to rock, slope, seepage.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Klinesville------	Severe: depth to rock, slope.	Severe: seepage, thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
WsA*---------- Wheeling	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
WsB*---------- Wheeling	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable.
WsC*---------- Wheeling	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
WyB---------- Wyoming	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AbB---------- Albrights	0-10	Silt loam----------	ML, CL	A-4	0-10	80-100	80-95	70-90	55-80	---	---
	10-30	Clay loam, silt loam, silty clay loam.	ML, CL, SM, SC	A-4, A-6	0-15	80-100	65-95	60-90	40-85	25-40	3-15
	30-60	Silt loam, gravelly silty clay loam, channery clay loam.	CL, ML, SC, SM-SC	A-4, A-2, A-6	0-15	65-100	45-95	40-90	25-80	20-40	3-15
AnA, AnD---------- Allenwood	0-11	Gravelly silt loam.	ML-CL, CL GC, SC	A-4, A-6	0-10	60-85	60-85	50-85	40-80	25-35	5-20
	11-56	Loam, gravelly clay, gravelly clay loam.	CL, GM, GC, MH	A-4, A-6, A-7, A-5	0-15	60-95	45-90	45-90	40-85	25-57	5-23
	56-89	Clay, gravelly silty clay loam, clay loam.	CL, SM, GM, MH	A-6, A-5, A-4, A-7	0-20	55-100	45-80	40-80	35-75	5-55	NP-23
AoB*, AoC*: Allenwood-------	0-11	Gravelly silt loam.	ML-CL, CL GC, SC	A-4, A-6	0-10	60-85	60-85	50-85	40-80	25-35	5-20
	11-56	Loam, gravelly clay, gravelly clay loam.	CL, GM, GC, MH	A-4, A-6, A-7, A-5	0-15	60-95	45-90	45-90	40-85	25-57	5-23
	56-89	Clay, gravelly silty clay loam, clay loam.	CL, SM, GM, MH	A-6, A-5, A-4, A-7	0-20	55-100	45-80	40-80	35-75	5-55	NP-23
Washington------	0-8	Silt loam---------	CL, ML	A-4, A-6	0-5	85-100	85-95	65-90	55-75	25-40	3-15
	8-48	Clay loam, silty clay loam, gravelly loam.	CL, SC, ML, SM	A-4, A-6	0-5	75-100	60-95	50-90	35-85	25-40	3-15
	48-62	Clay loam, silt loam, gravelly loam.	CL, SC	A-4, A-6, A-2, A-1	0-15	70-95	40-95	30-85	15-75	25-35	8-15
ArA, ArB, ArC---- Alvira	0-9	Silt loam---------	ML	A-4	0-5	90-100	80-95	70-90	50-80	---	---
	9-20	Silt loam, silty clay loam, gravelly loam.	CL, CL-ML, GM-GC, SM-SC	A-4, A-6	0-10	65-100	55-90	50-90	35-85	25-40	5-15
	20-62	Gravelly silt loam, gravelly loam, silty clay loam.	CL, CL-ML, GM-GC, SM-SC	A-4, A-6, A-2	0-20	65-95	45-90	40-90	30-85	25-40	5-15
Ba*---------- Barbour	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0	80-100	75-100	50-95	30-90	15-25	2-7
	9-33	Silt loam, sandy loam, gravelly loam.	ML, SM, CL-ML, SM-SC	A-4, A-2, A-1	0	60-100	55-95	30-95	15-85	15-25	2-7
	33-66	Loamy sand, very gravelly sand, gravelly loamy fine sand.	SM, SP, GM, GP	A-1, A-2, A-3, A-4	0-5	35-95	30-95	20-80	2-40	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Bb*:											
Barbour	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4, A-2	0	80-100	75-100	50-95	30-90	15-25	2-7
	9-33	Silt loam, sandy loam, gravelly loam.	ML, SM, CL-ML, SM-SC	A-4, A-2, A-1	0	60-100	55-95	30-95	15-85	15-25	2-7
	33-66	Loamy sand, very gravelly sand, gravelly loamy fine sand.	SM, SP, GM, GP	A-1, A-2, A-3, A-4	0-5	35-95	30-95	20-80	2-40	---	NP
Linden	0-10	Silt loam	ML, SM	A-4	0	80-100	80-100	65-100	40-90	---	---
	10-48	Silt loam, gravelly loam, sandy loam.	ML, SM	A-4, A-2	0-5	80-100	65-100	40-95	25-90	<30	NP-3
	48-60	Loam, gravelly sandy loam, very gravelly sand.	SM, GM, ML, SP-SM	A-2, A-1, A-3, A-4	0-20	40-100	30-100	15-90	5-75	<25	NP-5
Bc*, Bd*, Basher	0-5	Silt loam	ML, CL-ML, SM, SM-SC	A-4, A-2, A-1	0-5	80-100	75-100	45-100	20-90	15-25	2-7
	5-24	Silt loam, loam, gravelly sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	24-56	Silt loam, gravelly loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-4, A-2, A-1	0-5	75-100	70-100	40-100	20-90	15-25	2-7
	56-65	Gravelly loamy sand, very gravelly sand.	GP, SW, SM, ML	A-1, A-2, A-4, A-3	0-5	30-100	25-100	10-85	1-55	---	NP
BeB, BeC, Bedington	0-10	Silt loam	ML, CL, CL-ML	A-4	0	85-100	80-100	75-95	60-95	20-35	2-10
	10-47	Silt loam, channery silty clay loam, very shaly loam.	GM, SM, ML, SM-SC	A-4, A-2, A-6, A-7	0-30	40-90	30-90	25-75	20-65	25-45	5-15
	47-54	Channery loam, very shaly silt loam, very channery silty clay loam.	SM, GM	A-4, A-2, A-1, A-7	0-30	40-85	20-80	15-75	15-45	20-45	1-15
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BkB, BkC, BkD, Berks	0-11	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
	11-24	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	24-30	Shaly loam, very shaly loam, shaly silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
BuB, Buchanan	0-10	Gravelly loam	GM, ML, CL, CL-ML	A-4, A-2	0-10	50-100	45-90	40-75	30-65	20-35	2-11
	10-20	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-4, A-2,	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	20-60	Gravelly loam, silt loam, channery clay loam.	GM, ML, CL, SM	A-4, A-2, A-6, A-1	0-20	50-100	30-80	30-75	20-60	20-35	2-15

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BxB, BxD---------- Buchanan	0-10	Very stony loam	GM, ML, CL, CL-ML	A-2, A-4	3-20	50-95	45-90	40-75	30-65	20-35	2-11
	10-20	Gravelly loam, silt loam, gravelly sandy clay loam.	GM, ML, CL, SM	A-2, A-4, A-1	0-20	50-100	45-90	40-90	20-80	20-35	2-15
	20-60	Gravelly loam, loam, channery clay loam.	GM, ML, CL, SM	A-2, A-4, A-6, A-1	0-20	50-100	30-80	30-75	20-60	20-35	2-15
CaB*:											
Calvin----------	0-8	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	8-25	Shaly silt loam, channery loam, very shaly clay loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	25-32	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville-----	0-7	Shaly silt loam	GM, SM	A-2, A-4	0-10	55-85	45-60	35-50	25-40	---	---
	7-11	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	11-17	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CaC*, CaD*:											
Calvin----------	0-8	Shaly silt loam	ML, CL	A-4	0-15	70-95	70-90	65-90	55-75	---	---
	8-25	Shaly silt loam, channery loam, very shaly clay loam.	ML, SM, GM	A-2, A-4, A-6	0-15	70-95	55-90	40-90	30-75	22-38	NP-11
	25-32	Shaly silt loam, very shaly silt loam, very channery loam.	GM, SM, SC, GC	A-2, A-1, A-4, A-6	0-20	35-75	30-65	15-60	15-40	23-39	3-13
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville-----	0-7	Shaly silt loam	GM, SM	A-2, A-4	0-10	55-85	45-60	35-50	25-40	---	---
	7-11	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	11-17	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
DeB---------- Dekalb	0-2	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-9
	2-15	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	15-33	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DeD, DeF--------- Dekalb	0-2	Extremely stony sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-9
	2-22	Channery sandy loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	22-33	Channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Dy*. Dystrochrepts											
EdB*, EdC*, EdD*- Edom	0-9	Shaly silt loam	ML, CL	A-4, A-6	0-5	80-95	65-80	60-75	55-70	---	---
	9-39	Silty clay, channery clay, shaly silty clay loam.	CH, CL	A-7, A-6	0-10	70-90	65-85	65-85	55-80	35-55	12-30
	39-75	Shaly silty clay loam, channery silty clay, shaly clay.	GM, ML, SM	A-7, A-6, A-2	5-20	25-80	20-70	15-60	15-55	35-49	10-20
	75	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
EsB, EsC, EsD---- Elliber	0-6	Cherty silt loam	GM	A-2, A-1, A-4	5-10	45-80	40-75	20-50	15-40	---	---
	6-74	Cherty silt loam, very cherty clay loam, very cherty loam.	GM, SP-SM, SM, GP-GM	A-2, A-1, A-4	20-40	40-65	30-60	25-50	5-40	20-35	NP-7
EtB, EtC, EtD, EtF---------- Elliber	0-6	Very cherty silt loam.	GM, GP	A-2, A-1, A-4	5-15	30-60	20-55	15-45	10-40	---	---
	6-74	Cherty silt loam, very cherty clay loam, very cherty loam.	GM, SP-SM, SM, GP-GM	A-2, A-1, A-4	20-40	40-65	30-60	25-50	5-40	20-35	NP-7
EvB---------- Evendale	0-8	Cherty silt loam	ML, CL, GM	A-4, A-6	0-10	60-95	50-85	45-85	35-80	---	---
	8-51	Silty clay loam, cherty silty clay loam, clay.	ML, MH, CL, CH	A-6, A-7	0-20	70-95	60-85	60-85	55-80	35-55	15-25
	51-64	Shaly clay loam, very shaly silty clay loam, shaly clay.	ML, MH, CL, GC	A-6, A-7	0-25	60-85	45-70	45-70	40-65	35-55	15-25
	64	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HaB, HaC, HaD---- Hagerstown	0-8	Silt loam---------	CL, CL-ML	A-4, A-6, A-7	0-15	85-100	80-100	80-100	70-95	25-50	5-25
	8-16	Clay, clay loam, loam.	CL, CH	A-7	0-5	90-100	80-100	75-100	55-95	48-65	26-34
	16-62	Clay, silty clay, silty clay loam.	CH, CL	A-7, A-6	0-5	85-100	80-100	75-100	75-95	30-70	15-40

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HtB, HtC, HtD---- Hartleton	0-8	Channery silt loam.	SM, ML	A-4	10-20	80-95	70-90	60-90	45-80	---	---
	8-45	Channery silt loam, very channery loam, channery silty clay loam.	GM, ML, SM	A-2, A-4	25-65	60-90	45-80	40-80	30-75	20-30	NP-7
	45-56	Very channery loam, very shaly silt loam.	SM, GM, ML	A-1, A-2, A-4	55-85	40-80	25-70	20-70	15-60	20-30	NP-7
	56	Weathered bedrock	---	---	---	---	---	---	---	---	---
HuB*, HuD*, HuF*: Hazleton--------	0-4	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	15-50	60-85	50-80	50-70	35-55	---	---
	4-43	Channery sandy loam, channery loam, loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	43-60	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	5-60	55-80	35-75	25-65	15-50	<30	NP-8
Clymer----------	0-1	Extremely stony sandy loam.	ML, SM, GM	A-4, A-2	15-30	60-100	50-95	45-90	30-85	10-30	NP-9
	1-30	Sandy loam, channery loam, channery clay loam.	GM, SM, GC, ML	A-2, A-4	0-20	60-95	50-95	45-85	30-60	14-32	NP-9
	30-66	Channery loam, very channery loam, channery sandy loam.	GM, GP-GM, GC, SM	A-1, A-2, A-3, A-4	10-30	30-75	25-70	20-60	5-40	14-32	NP-9
Hv, Hy, Hz------- Holly	0-11	Silt loam--------	ML	A-4	0	90-100	85-100	80-100	70-90	25-35	3-10
	11-42	Silt loam, loam, sandy loam.	ML, SM	A-4, A-6	0	85-100	75-100	70-95	45-85	20-40	NP-14
	42-60	Stratified silt loam to gravelly sand.	ML, SM, SP-SM	A-4, A-2, A-1	0-5	70-100	65-100	40-90	10-70	20-40	NP-10
KmB---------- Kreamer	0-12	Cherty silt loam	ML, GM	A-4	0-10	65-90	45-75	40-75	35-70	---	---
	12-33	Cherty silty clay loam, cherty clay loam, clay.	ML, GM, SM	A-7, A-6, A-4	0-10	60-95	45-90	40-90	35-85	35-49	9-20
	33-75	Cherty silty clay, cherty clay loam, clay.	CL, GC, SC	A-6, A-4, A-7	0-10	60-95	45-90	40-90	35-85	25-45	7-20
LaB, LaC--------- Laidig	0-4	Gravelly loam----	GM, SM, ML, CL	A-4	0-5	65-90	55-80	50-80	35-70	15-30	1-10
	4-33	Gravelly loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	33-65	Channery sandy clay loam, channery loam, channery sandy loam.	GC, SC, GM-GC, CL-ML	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LbB---------- Laidig	0-4	Extremely stony loam.	GM-GC, CL-ML, SM-SC, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	4-33	Gravelly loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	33-65	Channery sandy clay loam, channery loam, channery sandy loam.	GC, GM-GC, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
LdD*, LdF*: Laidig----------	0-4	Extremely stony loam.	GM-GC, CL-ML, SM-SC, SM	A-4	15-30	65-90	50-80	45-80	35-70	15-30	NP-10
	4-33	Gravelly loam, channery sandy clay loam, channery sandy loam.	SM, SC, CL, ML	A-2, A-4, A-6	5-20	70-95	55-90	40-80	20-70	15-40	2-18
	33-65	Channery sandy clay loam, channery loam, channery sandy loam.	GC, GM-GC, CL-ML, SC	A-2, A-4, A-6	5-20	50-90	40-85	30-80	15-70	15-35	2-16
Meckesville-----	0-4	Extremely stony silt loam.	ML	A-4	15-25	80-100	70-95	65-85	55-80	---	---
	4-36	Loam, channery silt loam, gravelly silty clay loam.	ML, CL, CL-ML	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	36-60	Loam, channery silt loam, gravelly clay loam.	ML, CL, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
LnB, LnC--------- Leck Kill	0-10	Shaly silt loam	SM, ML, GM	A-4	0-5	70-85	60-80	50-80	35-70	---	---
	10-43	Silt loam, channery loam, shaly silty clay loam.	GM, SC, GC, CL	A-4, A-2, A-6	0-10	60-90	50-85	40-80	30-70	23-40	2-17
	43-56	Very channery silt loam, very channery clay loam, very shaly loam.	SM, GM, GP-GM, SP-SM	A-2, A-1	0-30	30-70	10-30	8-30	6-25	25-40	2-13
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LtC---------- Leetonia	0-5	Extremely stony loamy sand.	GW, GM, SW, SM	A-1, A-2, A-3	20-50	45-85	35-70	20-55	2-20	---	NP
	5-21	Gravelly loamy sand, very gravelly loam.	GW, GM, SW, SM	A-1, A-2, A-3	15-50	45-85	25-70	20-55	2-20	---	NP
	21-60	Very gravelly sand, very gravelly loamy sand.	GW, GM, SW, SM	A-1	20-40	45-70	35-65	20-35	2-15	---	NP
Lw---------- Linden	0-10	Silt loam--------	ML, SM	A-4	0	80-100	80-100	65-100	40-90	---	---
	10-48	Silt loam, gravelly loam, sandy loam.	ML, SM	A-4, A-2	0-5	80-100	65-100	40-95	25-90	<30	NP-3
	48-60	Loam, gravelly sandy loam, very gravelly sand.	SM, GM, ML, SP-SM	A-2, A-1, A-3, A-4	0-20	40-100	30-100	15-90	5-75	<25	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MkB, MkC, MkD---- Meckesville	0-4	Silt loam--------	ML	A-4	0-10	90-100	85-95	70-85	55-70	---	---
	4-36	Loam, channery silt loam, gravelly silty clay loam.	ML, CL-ML, CL	A-4, A-6	0-20	60-100	60-95	60-90	55-70	25-40	2-15
	36-60	Loam, channery silt loam, gravelly clay loam.	ML, CL-ML, GM, SC	A-4, A-2	0-20	45-95	40-90	35-85	30-65	20-30	2-10
MoA, MoB--------- Monongahela	0-10	Silt loam--------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	10-23	Silt loam, clay loam, gravelly loam.	ML, CL, CL-ML	A-4, A-6	0-15	90-100	80-100	75-100	70-90	20-40	5-15
	23-48	Silt loam, sandy clay loam, gravelly loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	60-100	55-95	45-95	20-40	3-15
	48-63	Silt loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	10-20	75-100	60-90	60-85	40-85	20-40	1-15
OpB, OpD, OpE---- Opequon	0-5	Silty clay loam	CL, MH, CH	A-6, A-7	0-5	85-100	80-100	80-100	75-95	30-55	10-30
	5-16	Silty clay loam, clay, silty clay.	CH, MH, CL	A-6, A-7	0-10	80-100	60-100	60-100	55-95	35-65	15-40
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pa*. Pits											
Qu*. Quarries											
Ru*. Rubble land											
ShA, ShB--------- Shelmadine	0-5	Silt loam--------	ML	A-4	0-5	80-100	75-95	70-90	65-85	---	---
	5-29	Silt loam, channery silty clay loam, shaly silt loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	29-51	Silt loam, channery clay loam, shaly silty clay loam.	ML, CL	A-4, A-6	0-15	80-100	75-95	60-90	50-80	25-40	3-15
	51-61	Channery silt loam, channery loam, shaly loam.	GM, ML, SM	A-2, A-4, A-1	0-15	50-80	35-75	25-70	20-65	25-35	3-10
SmB---------- Shelmadine	0-5	Very stony silt loam.	ML	A-4	3-10	70-100	65-95	60-90	50-85	---	---
	5-29	Silt loam, channery silty clay loam, shaly silt loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	29-51	Silt loam, channery clay loam, shaly silty clay loam.	ML, CL	A-4, A-6	0-10	80-100	75-95	60-90	50-80	25-40	3-15
	51-61	Channery silt loam, channery loam, shaly loam.	GM, SM, ML	A-4, A-2, A-1	0-15	50-80	35-75	25-70	20-65	25-35	3-10

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ug*:											
Udifluvents.											
Fluvaquents.											
UoB, UoD, UoE----	0-8	Very stony loam	ML, CL, SM, GC	A-4, A-2	5-15	60-95	55-85	40-70	25-55	---	---
Ungers	8-40	Loam, channery sandy loam, very channery sandy clay loam.	GM, SM, ML	A-2, A-4	0-25	60-95	40-90	30-70	25-55	25-35	1-10
	40-54	Channery loam, very channery sandy loam.	GM, SM, GC, GM-GC	A-2, A-1	0-25	55-85	25-50	20-40	15-30	20-35	NP-11
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WaB----------	0-8	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0-10	85-100	85-95	65-90	55-75	25-40	3-15
Washington	8-48	Silty clay loam, gravelly clay loam, loam.	ML, CL-ML, CL, SM	A-4, A-6	0-10	75-100	60-95	50-90	45-85	25-40	3-15
	48-62	Silt loam, clay loam, gravelly loam.	ML, CL-ML, CL	A-4, A-6	0-10	75-95	60-95	55-85	50-70	20-40	3-15
WbA, WbB, WbC----	0-9	Silt loam--------	ML, CL	A-4	0-5	80-100	80-100	65-95	60-95	---	---
Watson	9-27	Gravelly silty clay loam, silt loam, gravelly loam.	CL, SC, GC	A-4, A-6, A-7	0-10	70-100	55-95	50-95	35-90	25-45	8-20
	27-61	Gravelly silty clay loam, silt loam, gravelly loam.	CL, GC, SC, CL-ML	A-4, A-6, A-2	0-15	55-100	50-100	45-95	30-85	25-39	4-15
WeB, WeC, WeD----	0-7	Shaly silt loam	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
Weikert	7-15	Shaly silt loam, very shaly silt loam.	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WkE*:											
Weikert---------	0-7	Shaly silt loam	GM, ML, SM	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	7-15	Shaly silt loam, very shaly silt loam.	GM, GP-GM	A-1, A-2	0-20	15-60	10-55	5-45	5-35	28-36	3-9
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Klinesville-----	0-7	Shaly silt loam	GM, SM	A-2, A-4	0-10	55-85	45-60	35-50	25-40	---	---
	7-11	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1, A-4	0-10	25-75	15-55	10-50	4-40	20-35	NP-9
	11-17	Shaly silt loam, very shaly silt loam.	GM, GP, SM, SP	A-2, A-1	0-20	15-60	10-50	10-40	4-30	20-35	NP-7
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WsA*, WsB*, WsC*--Wheeling	0-9	Silt loam--------	ML, CL, SM, SC	A-4	0	90-100	90-100	85-100	55-90	15-35	NP-10
	9-42	Silty clay loam, loam, gravelly sandy loam.	ML, CL, SM, SC	A-4, A-6	0-5	90-100	70-100	65-100	45-80	20-40	2-20
	42-60	Stratified very fine sand to very gravelly sand.	GM, SM, GP, GW	A-1, A-2, A-3, A-4	0-20	65-100	50-100	45-100	4-45	<20	NP-10
WyB---------- Wyoming	0-10	Gravelly sandy loam.	SM, SW-SM, GM, SP-SM	A-1, A-2, A-3	0-15	55-90	50-80	20-60	8-35	<30	NP-5
	10-26	Gravelly sandy loam, very gravelly sandy loam.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-25	40-75	35-70	5-55	5-35	<30	NP-5
	26-60	Very gravelly loamy sand, very gravelly sand, gravelly sandy loam.	GW, SM, SW, GP-GM	A-1	5-30	30-65	20-55	5-50	1-12	<25	NP-5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AbB----------	0-10	15-27	1.20-1.40	0.6-2.0	0.16-0.20	3.6-5.5	Low----------	0.32	3-2	1-4
Albrights	10-30	18-35	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28		
	30-60	18-35	1.40-1.70	0.2-0.6	0.04-0.08	4.5-6.5	Low----------	0.28		
AnA, AnD----------	0-11	10-25	1.20-1.40	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.24	4	1-4
Allenwood	11-56	25-42	1.40-1.60	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.17		
	56-89	25-40	1.40-1.60	0.6-2.0	0.03-0.10	3.6-5.5	Low----------	0.17		
AoB*, AoC*:										
Allenwood-------	0-11	10-25	1.20-1.40	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.24	4	1-4
	11-56	25-42	1.40-1.60	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.17		
	56-89	25-40	1.40-1.60	0.6-2.0	0.03-0.10	3.6-5.5	Low----------	0.17		
Washington------	0-8	15-25	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.3	Low----------	0.32	4	1-4
	8-48	25-35	1.35-1.65	0.6-2.0	0.16-0.20	5.6-7.3	Low----------	0.28		
	48-62	15-30	1.40-1.70	0.6-6.0	0.12-0.16	5.6-7.3	Low----------	0.32		
ArA, ArB, ArC----	0-9	10-20	1.40-1.60	0.6-2.0	0.16-0.20	3.6-5.5	Low----------	0.32	3-2	1-2
Alvira	9-20	18-35	1.40-1.60	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.37		
	20-62	18-35	1.50-1.70	0.06-0.2	0.08-0.12	3.6-5.5	Low----------	0.28		
Ba*----------	0-9	6-18	1.15-1.40	0.6-2.0	0.16-0.21	4.5-5.5	Low----------	0.32	5	1-5
Barbour	9-33	6-18	1.15-1.45	2.0-6.0	0.10-0.19	4.5-5.5	Low----------	0.32		
	33-66	1-8	1.25-1.55	6.0-20	0.02-0.07	4.5-5.5	Low----------	0.17		
Bb*:										
Barbour---------	0-9	6-18	1.15-1.40	0.6-2.0	0.16-0.21	4.5-5.5	Low----------	0.32	5	1-5
	9-33	6-18	1.15-1.45	2.0-6.0	0.10-0.19	4.5-5.5	Low----------	0.32		
	33-66	1-8	1.25-1.55	6.0-20	0.02-0.07	4.5-5.5	Low----------	0.17		
Linden----------	0-10	10-18	1.20-1.40	2.0-6.0	0.14-0.18	3.6-6.0	Low----------	0.37	4	1-4
	10-48	10-18	1.20-1.40	2.0-6.0	0.14-0.18	3.6-6.0	Low----------	0.37		
	48-60	5-25	1.20-1.40	6.0-20	0.05-0.08	3.6-6.0	Low----------	0.17		
Bc*, Bd*---------	0-5	6-18	1.15-1.40	0.6-2.0	0.15-0.21	3.6-6.0	Low----------	0.32	5	1-5
Basher	5-24	6-18	1.15-1.45	0.6-2.0	0.10-0.19	3.6-6.0	Low----------	0.32		
	24-56	6-18	1.25-1.55	0.2-2.0	0.10-0.19	4.5-6.5	Low----------	0.32		
	56-65	1-8	1.25-1.55	0.6-6.0	0.02-0.07	4.5-6.5	Low----------	0.17		
BeB, BeC---------	0-10	15-25	1.20-1.50	0.6-2.0	0.14-0.18	4.5-7.3	Low----------	0.28	4	1-3
Bedington	10-47	18-32	1.30-1.60	0.6-2.0	0.12-0.14	4.5-5.5	Low----------	0.20		
	47-54	18-32	1.40-1.60	0.6-2.0	0.08-0.12	4.5-5.5	Low----------	0.20		
	54	---	---	---	---	---	----------	----		
BkB, BkC, BkD----	0-11	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low----------	0.24	3	.5-3
Berks	11-24	5-27	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	24-30	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low----------	0.17		
	30	---	---	---	---	---	----------	----		
BuB----------	0-10	10-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Moderate-----	0.24	3-2	1-3
Buchanan	10-20	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.24		
	20-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Moderate-----	0.17		
BxB, BxD----------	0-10	10-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Moderate-----	0.24	3-2	---
Buchanan	10-20	18-30	1.30-1.60	0.6-2.0	0.10-0.16	3.6-5.5	Moderate-----	0.24		
	20-60	18-35	1.40-1.70	0.06-0.2	0.06-0.10	3.6-5.5	Moderate-----	0.17		
CaB*:										
Calvin----------	0-8	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20	3-2	.5-2
	8-25	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	25-32	15-25	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	32	---	---	---	---	---	----------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
CaB*:										
Klinesville-----	0-7	10-25	1.20-1.40	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	2	.5-2
	7-11	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	11-17	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	17	---	---	---	---	---	----------	----		
CaC*, CaD*:										
Calvin----------	0-8	10-25	1.20-1.40	2.0-6.0	0.10-0.16	4.5-6.0	Low----------	0.20	3-2	.5-2
	8-25	15-30	1.40-1.60	2.0-6.0	0.08-0.16	4.5-6.0	Low----------	0.20		
	25-32	15-25	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	32	---	---	---	---	---	----------	----		
Klinesville-----	0-7	10-25	1.20-1.40	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	2	.5-2
	7-11	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	11-17	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	17	---	---	---	---	---	----------	----		
DeB----------	0-2	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low----------	0.24	3	2-4
Dekalb	2-15	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low----------	0.17		
	15-33	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	33	---	---	---	---	---	----------	----		
DeD, DeF----------	0-2	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low----------	0.24	3	2-4
Dekalb	2-22	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low----------	0.17		
	22-33	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low----------	0.17		
	33	---	---	---	---	---	----------	----		
Dy*.										
Dystrochrepts										
EdB*, EdC*, EdD*-	0-9	25-35	1.20-1.50	0.6-2.0	0.12-0.18	5.1-7.3	Low----------	0.24	3	.5-4
Edom	9-39	35-60	1.30-1.60	0.2-2.0	0.10-0.14	5.1-7.3	Moderate-----	0.28		
	39-75	27-60	1.30-1.60	0.2-2.0	0.04-0.08	5.6-7.8	Moderate-----	0.17		
	75	---	---	---	---	---	----------	----		
EsB, EsC, EsD----	0-6	10-20	1.20-1.40	0.6-6.0	0.06-0.12	3.6-5.5	Low----------	0.24	3	1-3
Elliber	6-74	12-30	1.40-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
EtB, EtC, EtD,										
EtF----------	0-6	10-20	1.20-1.40	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17	3	1-3
Elliber	6-74	12-30	1.40-1.60	0.6-6.0	0.04-0.10	3.6-5.5	Low----------	0.17		
EvB----------	0-8	15-35	1.20-1.40	0.6-2.0	0.14-0.18	4.5-7.3	Low----------	0.32	3	1-3
Evendale	8-51	30-50	1.40-1.60	0.06-0.2	0.12-0.20	4.5-7.3	Moderate-----	0.32		
	51-64	30-50	1.40-1.60	0.06-0.6	0.08-0.16	4.5-5.5	Moderate-----	0.28		
	64	---	---	---	---	---	----------	----		
HaB, HaC, HaD----	0-8	15-35	1.20-1.40	0.6-6.0	0.16-0.24	4.5-5.5	Low----------	0.32	4	1-5
Hagerstown	8-16	23-60	1.20-1.60	0.6-2.0	0.10-0.24	4.5-7.3	Moderate-----	0.28		
	16-62	23-60	1.20-1.60	0.6-2.0	0.10-0.24	5.1-7.3	Moderate-----	0.28		
HtB, HtC, HtD----	0-8	10-25	1.20-1.40	0.6-6.0	0.10-0.14	4.5-5.5	Low----------	0.20	3	1-3
Hartleton	8-45	15-35	1.40-1.60	0.6-6.0	0.06-0.10	4.5-5.5	Low----------	0.20		
	45-56	15-27	1.40-1.60	0.6-6.0	0.04-0.08	4.5-5.5	Low----------	0.20		
	56	---	---	---	---	---	----------	----		
HuB*, HuD*, HuF*:										
Hazleton--------	0-4	7-18	1.20-1.40	2.0-6.0	0.08-0.16	3.6-5.5	Low----------	0.17	4	2-4
	4-43	7-18	1.20-1.40	2.0-20	0.04-0.12	3.6-5.5	Low----------	0.17		
	43-60	5-15	1.20-1.40	2.0-20	0.04-0.10	3.6-5.5	Low----------	0.17		
Clymer----------	0-1	15-27	1.20-1.40	0.6-2.0	0.10-0.16	3.6-5.5	Low----------	0.17	4	---
	1-30	18-30	1.20-1.50	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.15		
	30-66	15-27	1.20-1.40	0.6-6.0	0.06-0.08	3.6-5.5	Low----------	0.15		
Hv, Hy, Hz-------	0-11	15-27	1.20-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	2-5
Holly	11-42	18-30	1.20-1.50	0.2-2.0	0.17-0.21	5.1-7.3	Low----------	0.28		
	42-60	10-27	1.20-1.40	0.6-6.0	0.07-0.18	5.6-7.8	Low----------	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
KmB----------	0-12	10-25	1.30-1.50	0.6-2.0	0.12-0.16	4.5-7.3	Low----------	0.24	3	.7-2
Kreamer	12-33	33-50	1.50-1.70	0.06-0.2	0.10-0.14	4.5-7.3	Moderate-----	0.17		
	33-75	33-50	1.50-1.70	0.06-0.6	0.10-0.14	4.5-5.5	Moderate-----	0.17		
LaB, LaC----------	0-4	10-27	1.20-1.40	0.6-6.0	0.10-0.14	3.6-5.5	Low----------	0.28	4	1-4
Laidig	4-33	18-35	1.30-1.50	0.6-6.0	0.06-0.12	3.6-5.5	Low----------	0.28		
	33-65	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LbB----------	0-4	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.28	4	---
Laidig	4-33	18-35	1.30-1.50	0.6-6.0	0.06-0.12	3.6-5.5	Low----------	0.28		
	33-65	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
LdD*, LdF*:										
Laidig----------	0-4	7-27	1.20-1.40	0.6-6.0	0.08-0.12	3.6-5.5	Low----------	0.28	4	---
	4-33	18-35	1.30-1.50	0.6-6.0	0.06-0.12	3.6-5.5	Low----------	0.28		
	33-65	18-35	1.30-1.60	0.2-0.6	0.06-0.10	3.6-5.5	Low----------	0.17		
Meckesville-----	0-4	10-27	1.10-1.30	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.28	4	1-4
	4-36	18-35	1.20-1.40	0.6-2.0	0.10-0.14	3.6-5.5	Low----------	0.24		
	36-60	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
LnB, LnC----------	0-10	10-20	1.20-1.50	0.6-6.0	0.14-0.18	4.5-6.0	Low----------	0.24	3	1-3
Leck Kill	10-43	17-32	1.40-1.70	0.6-6.0	0.12-0.16	4.5-6.0	Low----------	0.24		
	43-56	17-32	1.30-1.60	0.6-6.0	0.04-0.08	4.5-6.0	Low----------	0.17		
	56	---	---	---	---	---	----------	----		
LtC----------	0-5	3-10	1.10-1.30	2.0-6.0	0.03-0.05	3.6-5.0	Low----------	0.17	3	---
Leetonia	5-21	3-15	1.10-1.30	2.0-6.0	0.03-0.05	3.6-5.0	Low----------	0.17		
	21-60	3-10	1.10-1.30	6.0-20	0.02-0.03	3.6-5.0	Low----------	0.17		
Lw----------	0-10	10-18	1.20-1.40	2.0-6.0	0.14-0.18	3.6-6.0	Low----------	0.37	4	1-4
Linden	10-48	10-18	1.20-1.40	2.0-6.0	0.14-0.18	3.6-6.0	Low----------	0.37		
	48-60	5-25	1.20-1.40	6.0-20	0.05-0.08	3.6-6.0	Low----------	0.17		
MkB, MkC, MkD----	0-4	10-27	1.10-1.30	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.32	4	1-4
Meckesville	4-36	18-35	1.20-1.40	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.24		
	36-60	18-35	1.30-1.60	0.2-0.6	0.08-0.12	3.6-5.5	Low----------	0.24		
MoA, MoB----------	0-10	10-27	1.20-1.40	0.6-2.0	0.18-0.24	4.5-5.5	Low----------	0.43	3	2-4
Monongahela	10-23	18-35	1.30-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.43		
	23-48	18-35	1.30-1.60	0.06-0.6	0.08-0.12	4.5-5.5	Low----------	0.43		
	48-63	10-35	1.20-1.40	0.2-0.6	0.08-0.12	4.5-5.5	Low----------	0.37		
OpB, OpD, OpE----	0-5	27-45	1.20-1.50	0.2-2.0	0.16-0.21	5.6-7.3	High----------	0.37	2	1-4
Opequon	5-16	35-65	1.40-1.70	0.2-2.0	0.12-0.16	5.6-7.3	High----------	0.28		
	16	---	---	---	---	---	----------	----		
Pa*.										
Pits										
Qu*.										
Quarries										
Ru*.										
Rubble land										
ShA, ShB----------	0-5	10-17	1.20-1.50	0.6-2.0	0.14-0.18	3.6-5.5	Low----------	0.32	3-2	1-3
Shelmadine	5-29	22-35	1.50-1.70	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.28		
	29-51	22-35	1.60-1.80	0.06-0.2	0.06-0.10	3.6-5.5	Low----------	0.28		
	51-61	10-27	1.40-1.60	0.06-0.6	0.10-0.14	3.6-5.5	Low----------	0.28		
SmB----------	0-5	10-17	1.20-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low----------	0.17	3-2	1-3
Shelmadine	5-29	22-35	1.50-1.70	0.6-2.0	0.08-0.14	3.6-5.5	Low----------	0.28		
	29-51	22-35	1.60-1.80	0.06-0.2	0.06-0.10	3.6-5.5	Low----------	0.28		
	51-61	10-27	1.40-1.60	0.06-0.6	0.10-0.14	3.6-5.5	Low----------	0.28		
Ug*:										
Udifluvents.										

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH				Pct
Ug*:										
Fluvaquents.										
UoB, UoD, UoE----	0-8	10-20	1.20-1.40	0.6-2.0	0.10-0.18	3.6-5.0	Low----------	0.17	3	1-2
Ungers	8-40	17-27	1.30-1.50	0.6-2.0	0.10-0.14	3.6-5.0	Low----------	0.17		
	40-54	10-20	1.30-1.50	0.6-2.0	0.06-0.12	3.6-5.0	Low----------	0.17		
	54	---	---	---	---	---	----------	----		
WaB----------	0-8	15-25	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.3	Low----------	0.32	4	1-4
Washington	8-48	25-35	1.30-1.60	0.2-0.6	0.16-0.20	5.6-7.3	Moderate-----	0.28		
	48-62	15-30	1.40-1.65	0.2-0.6	0.12-0.18	5.6-7.3	Moderate-----	0.32		
WbA, WbB, WbC----	0-9	12-27	1.20-1.40	0.6-2.0	0.14-0.18	4.5-5.5	Low----------	0.37	3	1-3
Watson	9-27	17-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-----	0.17		
	27-61	15-30	1.60-1.80	0.06-0.2	0.08-0.12	4.5-5.5	Moderate-----	0.17		
WeB, WeC, WeD----	0-7	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2	1-3
Weikert	7-15	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	15	---	---	---	---	---	----------	----		
WkE*:										
Weikert---------	0-3	15-27	1.20-1.40	2.0-6.0	0.08-0.14	4.5-6.0	Low----------	0.28	2	1-3
	7-15	15-27	1.20-1.40	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.28		
	15	---	---	---	---	---	----------	----		
Klinesville-----	0-7	10-25	1.20-1.40	2.0-6.0	0.08-0.12	4.5-6.0	Low----------	0.20	2	.5-2
	7-11	10-20	1.40-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Low----------	0.20		
	11-17	10-20	1.40-1.60	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.20		
	17	---	---	---	---	---	----------	----		
WsA*, WsB*, WsC*-	0-9	12-20	1.20-1.40	0.6-6.0	0.12-0.18	5.1-6.0	Low----------	0.32	4	1-3
Wheeling	9-42	18-30	1.30-1.50	0.6-2.0	0.08-0.16	5.1-6.0	Low----------	0.28		
	42-60	8-15	1.30-1.50	6.0-20	0.04-0.08	5.1-6.0	Low----------	0.24		
WyB----------	0-10	8-18	1.10-1.40	6.0-20	0.06-0.14	3.6-6.0	Low----------	0.17	3	2-4
Wyoming	10-26	5-15	1.10-1.50	6.0-20	0.06-0.09	3.6-6.0	Low----------	0.17		
	26-60	1-11	1.30-1.60	6.0-20	0.02-0.04	3.6-6.0	Low----------	0.17		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AbB---------- Albrights	C	None---------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
AnA, AnD---------- Allenwood	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
AoB*, AoC*:												
Allenwood--------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
Washington-------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
ArA, ArB, ArC----- Alvira	C	None---------	---	---	0.5-1.5	Perched	Oct-May	>60	---	High-----	High-----	High.
Ba*---------- Barbour	B	Frequent----	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
Bb*:												
Barbour----------	B	Rare---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
Linden----------	B	Rare---------	---	---	3.0-6.0	Apparent	Nov-Mar	>60	---	Moderate	Low------	High.
Bc*---------- Basher	B	Occasional	Brief to long.	Dec-Apr	1.0-3.0	Apparent	Dec-May	>60	---	High-----	Moderate	Moderate.
Bd*---------- Basher	B	Frequent----	Brief to long.	Dec-Apr	1.0-3.0	Apparent	Dec-May	>60	---	High-----	Moderate	Moderate.
BeB, BeC---------- Bedington	B	None---------	---	---	>6.0	---	---	>48	Soft	Moderate	Low------	High.
BkB, BkC, BkD----- Berks	C	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
BuB, BxB, BxD----- Buchanan	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	Moderate	High-----	High.
CaB*, CaC*, CaD*:												
Calvin----------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	Moderate.
Klinesville------	C/D	None---------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	High.
DeB, DeD, DeF----- Dekalb	C	None---------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Dy*. Dystrochrepts												
EdB*, EdC*, EdD*-- Edom	C	None---------	---	---	>6.0	---	---	>40	Soft	Moderate	High-----	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
EsB, EsC, EsD, EtB, EtC, EtD, EtF---------- Elliber	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
EvB---------- Evendale	C	None--------	---	---	0.5-1.5	Perched	Nov-Mar	>48	Soft	High-----	High-----	High.
HaB, HaC, HaD----- Hagerstown	C	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Moderate	Low.
HtB, HtC, HtD----- Hartleton	B	None--------	---	---	>6.0	---	---	>40	Soft	Moderate	Low------	High.
HuB*, HuD*, HuF*: Hazleton----------	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
Clymer----------	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
Hv---------- Holly	B/D	Frequent----	Brief to long.	Nov-May	0-0.5	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
Hy---------- Holly	D	Frequent----	Very long	Sep-Jun	+1-0.5	Apparent	Jan-Dec	>60	---	High-----	High-----	Moderate.
Hz---------- Holly	B/D	Rare--------	Brief to long.	Nov-May	0-0.5	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
KmB---------- Kreamer	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	High-----	High-----	Moderate.
LaB, LaC, LbB----- Laidig	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
LdD*, LdF*: Laidig----------	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
Meckesville------	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
LnB, LnC---------- Leck Kill	B	None--------	---	---	>6.0	---	---	>40	Soft	Moderate	Low------	Moderate.
LtC---------- Leetonia	C	None--------	---	---	>6.0	---	---	>40	Hard	Low------	Low------	High.
Lw---------- Linden	B	Common------	Very brief to brief.	Jan-Apr	3.0-6.0	Apparent	Nov-Apr	>60	---	Moderate	Low------	High.
MkB, MkC, MkD----- Meckesville	C	None--------	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	High.
MoA, MoB---------- Monongahela	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	Moderate	High-----	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
OpB, OpD, OpE----- Opequon	C	None--------	---	---	>6.0	---	---	12-20	Hard	Moderate	Moderate	Low.
Pa*. Pits												
Qu*. Quarries												
Ru*. Rubble land												
ShA, ShB, SmB----- Shelmadine	D	None--------	---	---	0-0.5	Perched	Sep-Jun	>60	---	High-----	High-----	High.
Ug*: Udifluvents.												
Fluvaquents.												
UoB, UoD, UoE----- Ungers	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
WaB---------- Washington	C	None--------	---	---	1.5-3.0	Apparent	Nov-Apr	>60	---	Moderate	Moderate	Low.
WbA, WbB, WbC----- Watson	C	None--------	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
WeB, WeC, WeD----- Weikert	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Moderate.
WkE*: Weikert----------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	Moderate.
Klinesville------	C/D	None--------	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate	High.
WsA*, WsB*, WsC*-- Wheeling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
WyB---------- Wyoming	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Albrights	Fine-loamy, mixed, mesic Aquic Fragiudalfs
Allenwood	Fine-loamy, mixed, mesic Typic Hapludults
Alvira	Fine-loamy, mixed, mesic Aeric Fragiaquults
Barbour	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Bedington	Fine-loamy, mixed, mesic Typic Hapludults
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
*Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
Calvin	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Clymer	Fine-loamy, mixed, mesic Typic Hapludults
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Dystrochrepts	Dystrochrepts
Edom	Fine, illitic, mesic Typic Hapludalfs
Elliber	Loamy-skeletal, mixed, mesic Typic Hapludults
Evendale	Clayey, mixed, mesic Aeric Ochraquults
Fluvaquents	Fluvaquents
*Hagerstown	Fine, mixed, mesic Typic Hapludalfs
Hartleton	Loamy-skeletal, mixed, mesic Typic Hapludults
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Holly	Fine-loamy, mixed, nonacid, mesic Typic Fluvaquents
Klinesville	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Kreamer	Clayey, illitic, mesic Aquic Hapludults
Laidig	Fine-loamy, mixed, mesic Typic Fragiudults
Leck Kill	Fine-loamy, mixed, mesic Typic Hapludults
Leetonia	Sandy-skeletal, siliceous, mesic Entic Haplorthods
Linden	Coarse-loamy, mixed, mesic Fluventic Dystrochrepts
Meckesville	Fine-loamy, mixed, mesic Typic Fragiudults
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Opequon	Clayey, mixed, mesic Lithic Hapludalfs
Shelmadine	Fine-loamy, mixed, mesic Typic Fragiaquults
Udifluvents	Udifluvents
Ungers	Fine-loamy, mixed, mesic Typic Hapludults
Washington	Fine-loamy, mixed, mesic Ultic Hapludalfs
Watson	Fine-loamy, mixed, mesic Typic Fragiudults
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Wheeling	Fine-loamy, mixed, mesic Ultic Hapludalfs
Wyoming	Loamy-skeletal, mixed, mesic Typic Dystrochrepts

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SOIL CONSERVATION SERVICE
PENNSYLVANIA STATE UNIVERSITY, COLLEGE OF AGRICULTURE
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
STATE CONSERVATION COMMISSION
UNION COUNTY BOARD OF COMMISSIONERS

GENERAL SOIL MAP

UNION COUNTY, PENNSYLVANIA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

LEGEND

1 — Laidig-Buchanan-Meckesville association. Nearly level to steep, deep, well drained and moderately well drained soils on mountain side slopes and foot slopes; formed in colluvial material weathered from sandstone and some shale

2 — Dekalb-Ungers-Hazleton association: Gently sloping to steep, moderately deep and deep, well drained soils on mountainsides and mountaintops; formed in material weathered from sandstone

3 — Edom association: Gently sloping to moderately steep, deep and moderately deep, well drained soils on uplands; formed in material weathered from calcareous shale

4 — Weikert-Berks-Hartleton association: Gently sloping to steep, shallow to deep, well drained soils on hills and ridges; formed in material weathered from shale and some sandstone

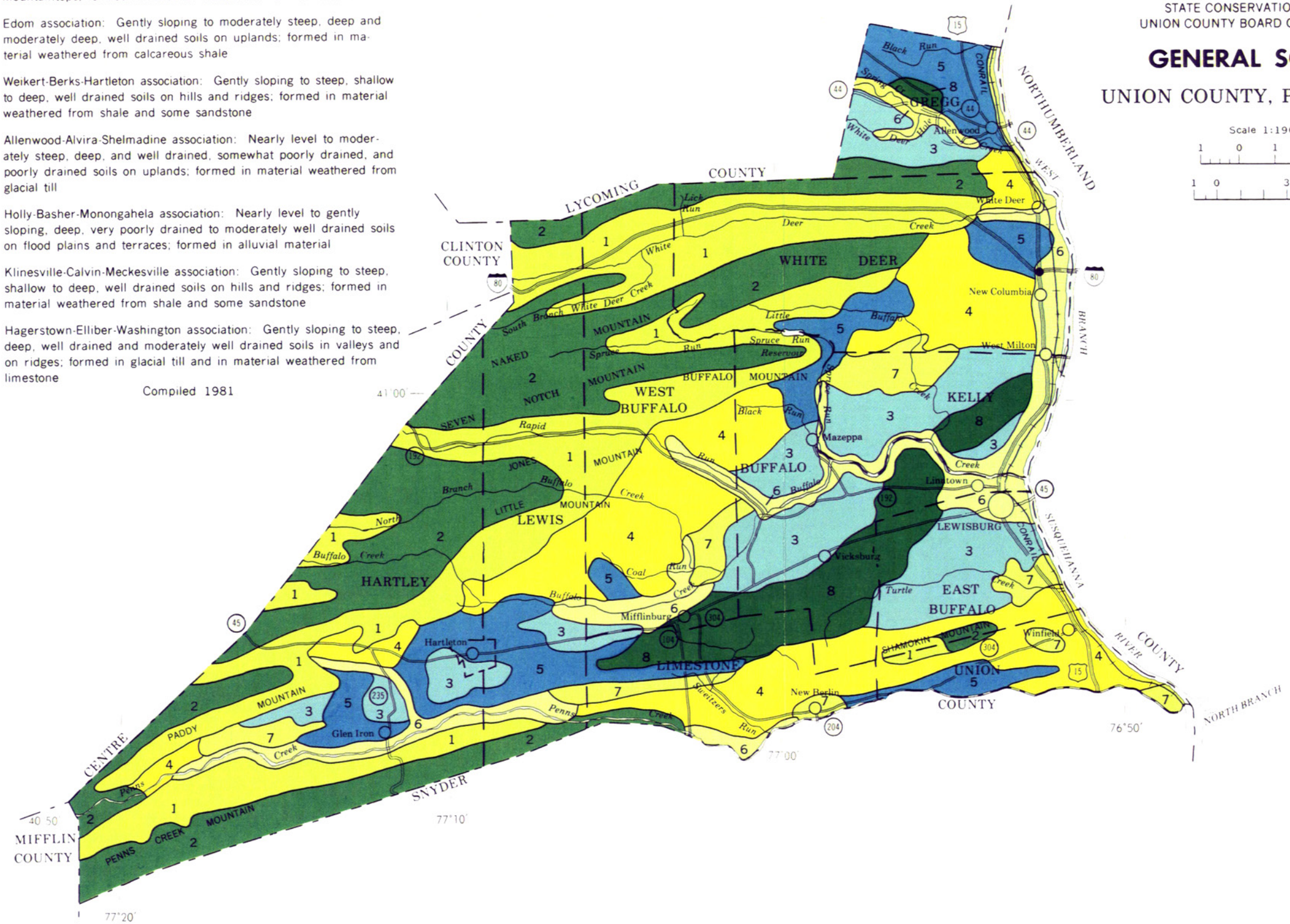
5 — Allenwood-Alvira-Shelmadine association: Nearly level to moderately steep, deep, and well drained, somewhat poorly drained, and poorly drained soils on uplands; formed in material weathered from glacial till

6 — Holly-Basher-Monongahela association: Nearly level to gently sloping, deep, very poorly drained to moderately well drained soils on flood plains and terraces; formed in alluvial material

7 — Klinesville-Calvin-Meckesville association: Gently sloping to steep, shallow to deep, well drained soils on hills and ridges; formed in material weathered from shale and some sandstone

8 — Hagerstown-Elliber-Washington association: Gently sloping to steep, deep, well drained and moderately well drained soils in valleys and on ridges; formed in glacial till and in material weathered from limestone

Compiled 1981



N

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

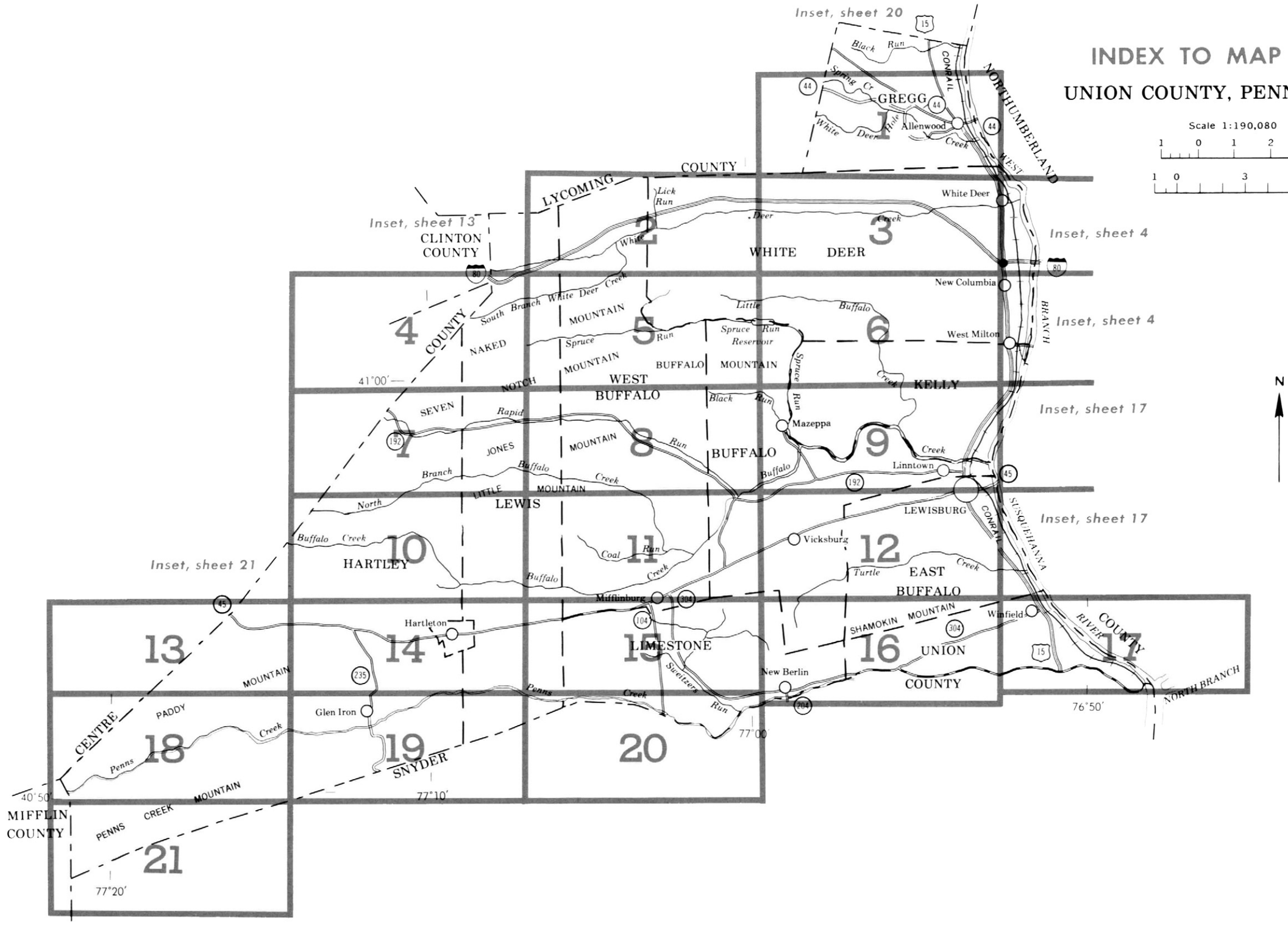
INDEX TO MAP SHEETS

UNION COUNTY, PENNSYLVANIA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNION COUNTY, PENNSYLVANIA

PENNSYLVANIA STATE UNIVERSITY, COLLEGE OF AGRICULTURE
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
STATE CONSERVATION COMMISSION
UNION COUNTY BOARD OF COMMISSIONERS

SOIL LEGEND

Publication symbols consist of letters. The first letter, always a capital, is the initial letter of the soil name. The second letter in each symbol is always a lower case letter. The third letter, if used, is a capital and connotes slope class. Symbols without a slope letter are for nearly level soils, soils named for higher categories, or miscellaneous area.

SYMBOL	NAME
AbB	Albrights silt loam, 3 to 8 percent slopes
AnA	Allenwood gravelly silt loam, 0 to 3 percent slopes
AnD	Allenwood gravelly silt loam, 15 to 25 percent slopes
AoB	Allenwood and Washington soils, 3 to 8 percent slopes
AoC	Allenwood and Washington soils, 8 to 15 percent slopes
ArA	Alvira silt loam, 0 to 3 percent slopes
ArB	Alvira silt loam, 3 to 8 percent slopes
ArC	Alvira silt loam, 8 to 15 percent slopes
Ba	Barbour soils, frequently flooded
Bb	Barbour-Linden complex, rarely flooded
Bc	Basher soils
Bd	Basher soils, frequently flooded
BeB	Bedington silt loam, 3 to 8 percent slopes
BeC	Bedington silt loam, 8 to 15 percent slopes
BkB	Berks shaly silt loam, 3 to 8 percent slopes
BkC	Berks shaly silt loam, 8 to 15 percent slopes
BkD	Berks shaly silt loam, 15 to 25 percent slopes
BuB	Buchanan gravelly loam, 3 to 8 percent slopes
BxB	Buchanan very stony loam, 0 to 8 percent slopes
BxD	Buchanan very stony loam, 8 to 25 percent slopes
CaB	Calvin-Klinesville shaly silt loams, 3 to 8 percent slopes
CaC	Calvin-Klinesville shaly silt loams, 8 to 15 percent slopes
CaD	Calvin-Klinesville shaly silt loams, 15 to 25 percent slopes
DeB	Dekalb extremely stony sandy loam, 0 to 8 percent slopes
DeD	Dekalb extremely stony sandy loam, 8 to 25 percent slopes
DeF	Dekalb extremely stony sandy loam, steep
Dy	Dystrochrepts, bouldery
EdB	Edom complex, 3 to 8 percent slopes
EdC	Edom complex, 8 to 15 percent slopes
EdD	Edom complex, 15 to 25 percent slopes
EsB	Elliber cherty silt loam, 3 to 8 percent slopes
EsC	Elliber cherty silt loam, 8 to 15 percent slopes
EsD	Elliber cherty silt loam, 15 to 25 percent slopes
EtB	Elliber very cherty silt loam, 3 to 8 percent slopes
EtC	Elliber very cherty silt loam, 8 to 15 percent slopes
EtD	Elliber very cherty silt loam, 15 to 25 percent slopes
EtF	Elliber very cherty silt loam, 25 to 70 percent slopes
EvB	Evendale cherty silt loam, 3 to 8 percent slopes
HaB	Hagerstown silt loam, 3 to 8 percent slopes
HaC	Hagerstown silt loam, 8 to 15 percent slopes
HaD	Hagerstown silt loam, 15 to 25 percent slopes
HtB	Hartleton channery silt loam, 3 to 8 percent slopes
HtC	Hartleton channery silt loam, 8 to 15 percent
HtD	Hartleton channery silt loam, 15 to 25 percent slopes
HuB	Hazleton and Clymer extremely stony sandy loams, 0 to 8 percent slopes
HuD	Hazleton and Clymer extremely stony sandy loams, 8 to 25 percent slopes
HuF	Hazleton and Clymer extremely stony sandy loams, 25 to 80 percent slopes
Hv	Holly silt loam
Hy	Holly silt loam, ponded
Hz	Holly silt loam, rarely flooded
KmB	Kreamer cherty silt loam, 3 to 8 percent slopes
LaB	Laidig gravelly loam, 3 to 8 percent slopes
LaC	Laidig gravelly loam, 8 to 15 percent slopes
LbB	Laidig extremely stony loam, 0 to 8 percent slopes
LdD	Laidig and Meckesville extremely stony soils, 8 to 25 percent slopes
LdF	Laidig and Meckesville extremely stony soils, steep
LnB	Leck Kill shaly silt loam, 3 to 8 percent slopes
LnC	Leck Kill shaly silt loam, 8 to 15 percent slopes
LtC	Leetonia extremely stony loamy sand, 0 to 15 percent slopes
Lw	Linden silt loam
MkB	Meckesville silt loam, 3 to 8 percent slopes
MkC	Meckesville silt loam, 8 to 15 percent slopes
MkD	Meckesville silt loam, 15 to 25 percent slopes
MoA	Monongahela silt loam, 0 to 3 percent slopes
MoB	Monongahela silt loam, 3 to 8 percent slopes
OpB	Opequon silty clay loam, 3 to 8 percent slopes
OpD	Opequon silty clay loam, 8 to 25 percent slopes
OpE	Opequon silty clay loam, 25 to 50 percent slopes
Pa	Pits
Qu	Quarries
Ru	Rubble land
ShA	Shelmadine silt loam, 0 to 3 percent slopes
ShB	Shelmadine silt loam, 3 to 8 percent slopes
SmB	Shelmadine very stony silt loam, 0 to 8 percent slopes
Ug	Udifluvents and Fluvaquents, gravelly
UoB	Ungers very stony loam, 3 to 8 percent slopes
UoD	Ungers very stony loam, 8 to 25 percent slopes
UoE	Ungers very stony loam, 25 to 50 percent slopes
WaB	Washington silt loam, wet substratum, 3 to 8 percent slopes
WbA	Watson silt loam, 0 to 3 percent slopes
WbB	Watson silt loam, 3 to 8 percent slopes
WbC	Watson silt loam, 8 to 15 percent slopes
WeB	Weikert shaly silt loam, 3 to 8 percent slopes
WeC	Weikert shaly silt loam, 8 to 15 percent slopes
WeD	Weikert shaly silt loam, 15 to 25 percent slopes
WkE	Weikert and Klinesville shaly silt loams, steep
WsA	Wheeling soils, 0 to 3 percent slopes
WsB	Wheeling soils, 3 to 8 percent slopes
WsC	Wheeling soils, 8 to 15 percent slopes
WyB	Wyoming gravelly sandy loam, 3 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline
- AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool
- STATE COORDINATE TICK
- LAND DIVISION CORNERS (sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate (21)
- Federal (173)
- State (28)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or small (water, w)

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
- Double-line (label) (CANAL)
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial (water, w)
- Intermittent (int, i)

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CnB, WaC2)

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

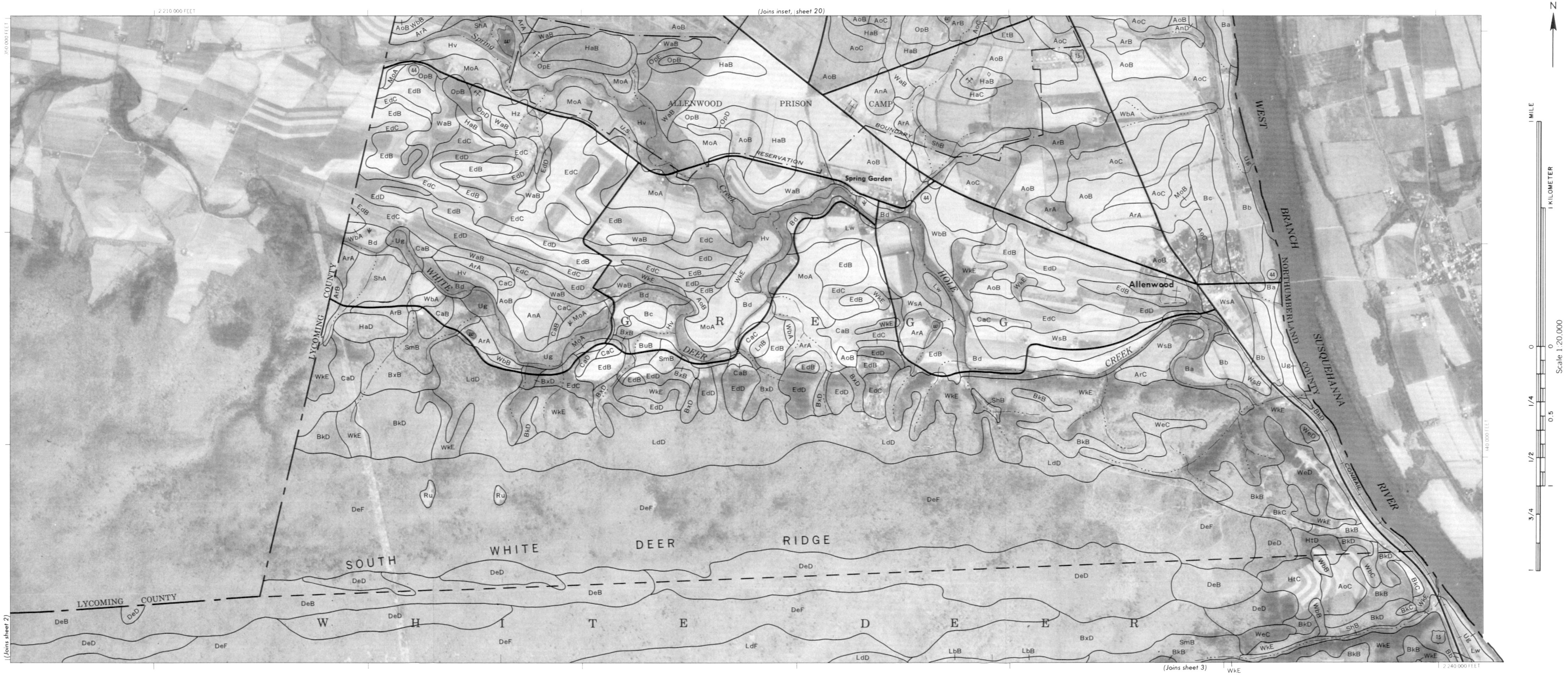
SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) (S)

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot



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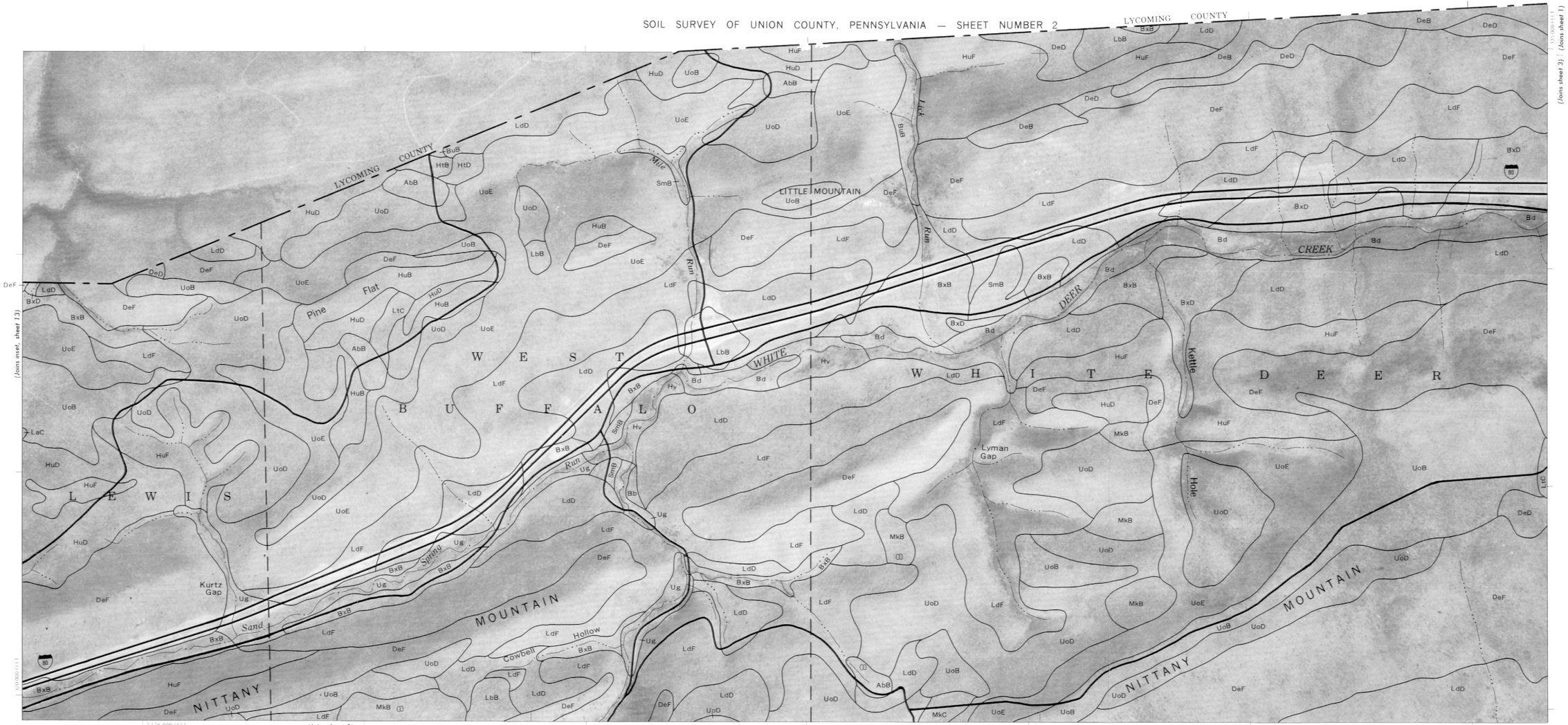
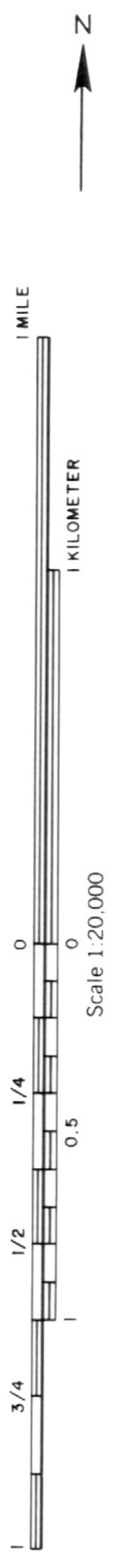

LYCOMING COUNTY
LYCOMING COUNTY
LITTLE MOUNTAIN
WHITE DEER CREEK
Mile Run
Lick Run
Pine Flat
Spring Run
Sand Hollow
Cowbell
Kurtz Gap
Lyman Gap
Kettle Hole
WEST BUFFALO
WHITE DEER
LEWIS
MOUNTAIN
NITTANY MOUNTAIN
(Joins inset, sheet 13)
(Joins sheet 5)
(Joins sheet 3)
(Joins sheet 1)
2 175 000 FEET
500 000 FEET
1 MILE
1 KILOMETER
Scale 1:20,000



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SOIL SURVEY OF UNION COUNTY, PENNSYLVANIA — SHEET NUMBER 4

INSET A

INSET B
(Joins lower left)

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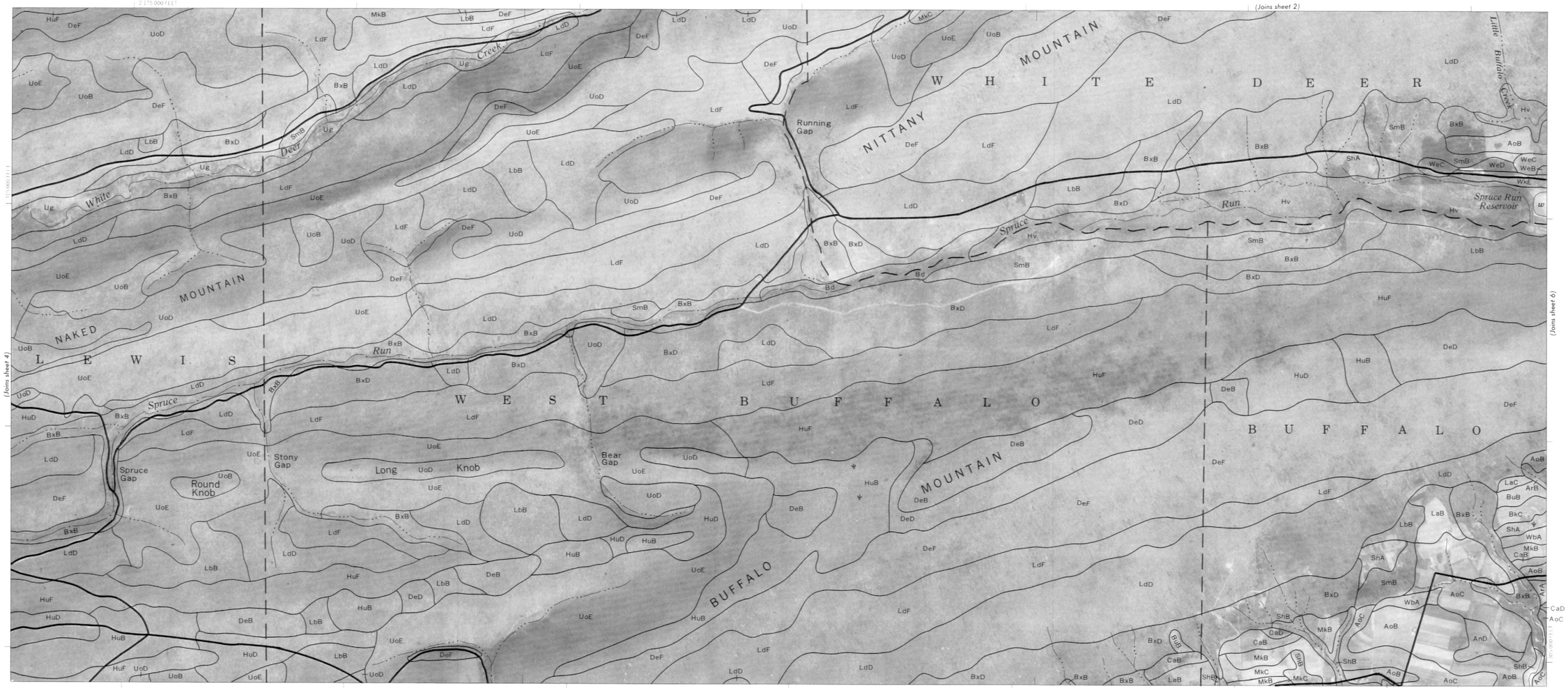

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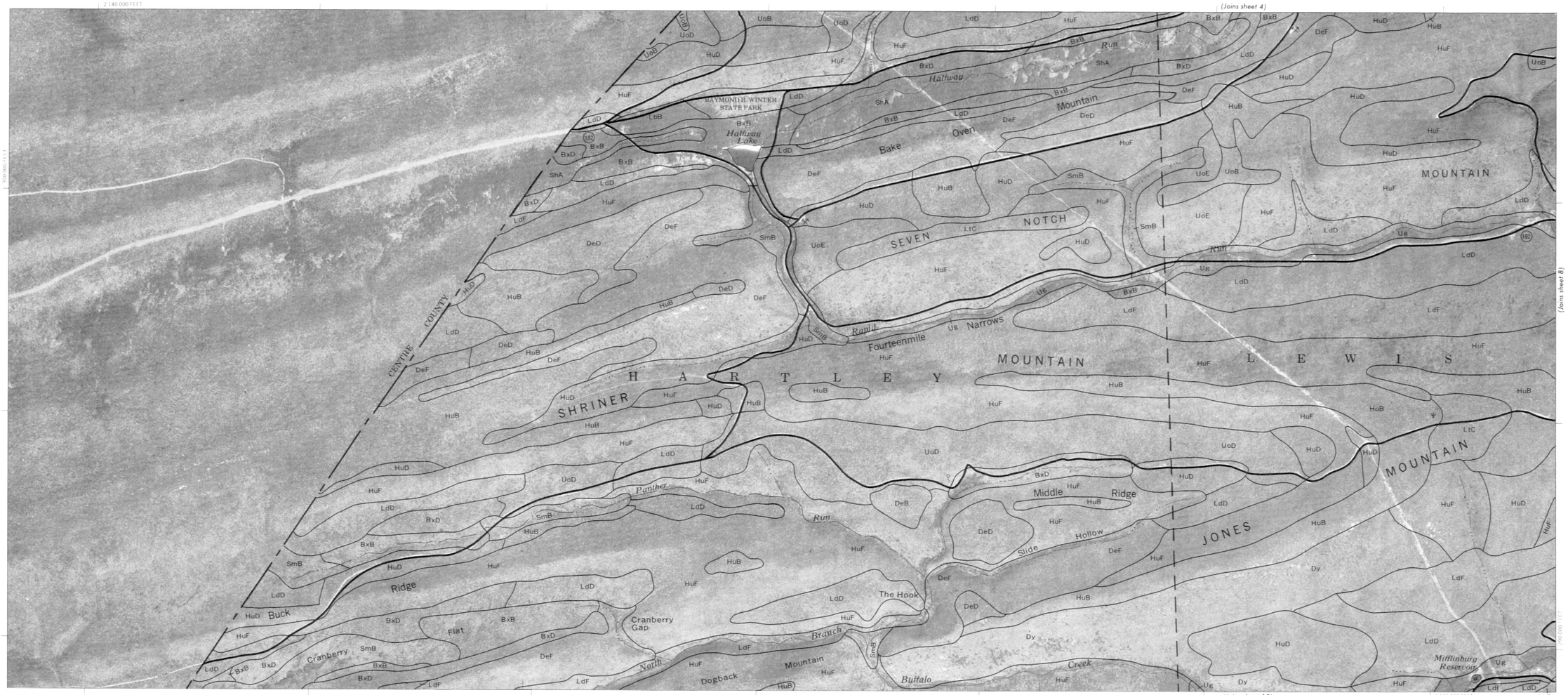
SOIL SURVEY OF UNION COUNTY, PENNSYLVANIA — SHEET NUMBER 6



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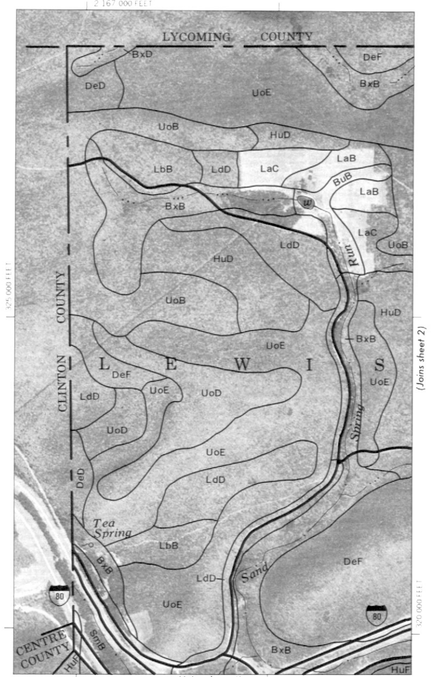
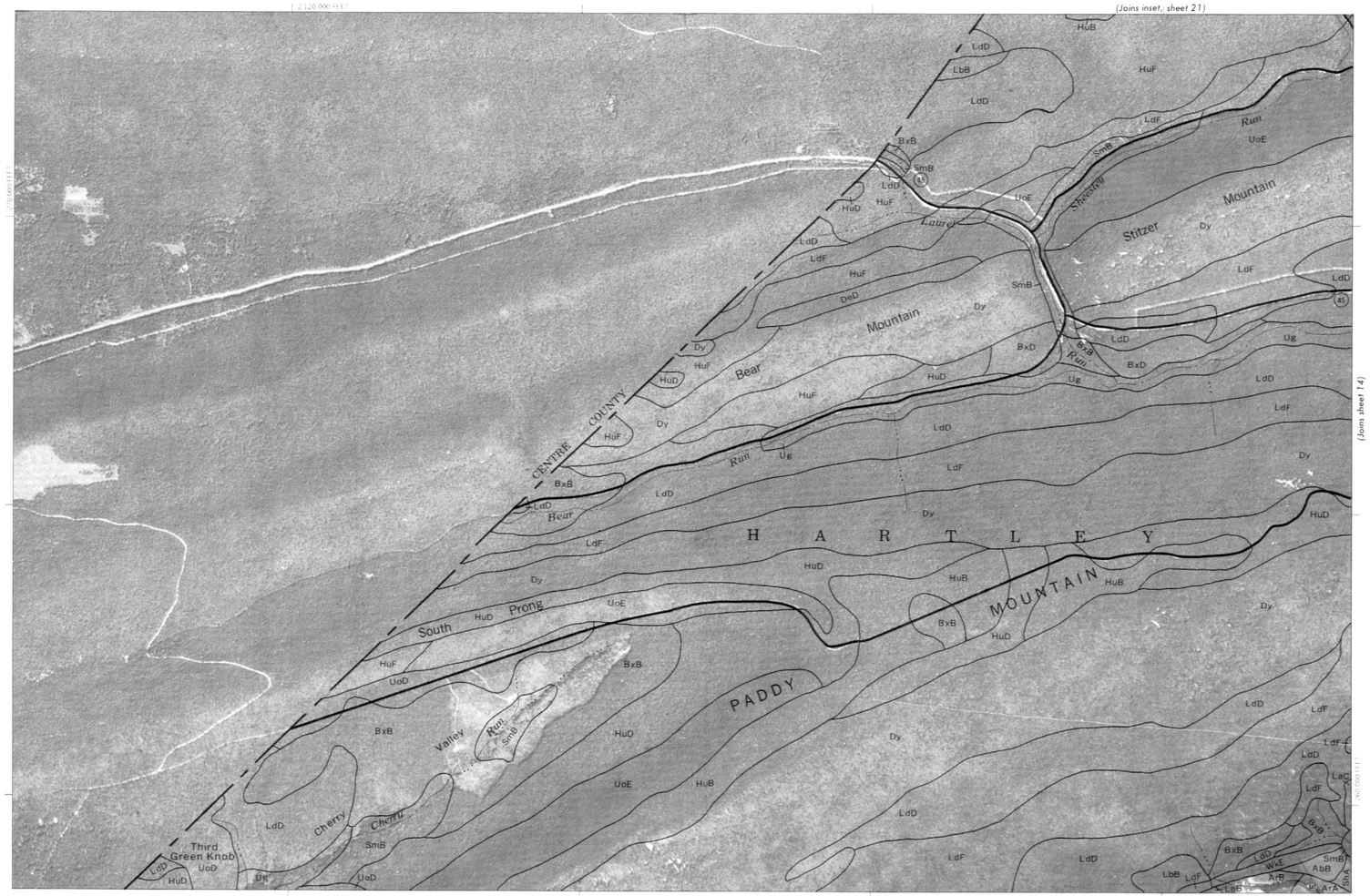
SOIL SURVEY OF UNION COUNTY, PENNSYLVANIA — SHEET NUMBER 10


2 175 000 FEET
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 15)
N
1 MILE
1 KILOMETER
Scale 1:20,000
LEWIS WEST BUFFALO
BUFFALO
Cowan
Red Bank
Lake McClure
Johnstown
Rand
MIFFLINBURG
LIMESTONE
CREEK
Buffalo Creek
Buffalo Run
Coal Run
North Branch
Buffalo Creek
ROAD IS TWP BDY
CONRAIL
1:2,205,000 FEET


N
1 MILE
1 KILOMETER
Scale 1:20,000
0
1/4
0.5
1/2
3/4
1
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
(Joins inset B, sheet 17)
BUFFALO
VALLEY
LIMESTONE
Limestone
Lochiel
Vicksburg
Linntown
LEWISBURG
BUCKNELL UNIVERSITY
West Lawn
College Park
SUSQUEHANNA RIVER
UNION COUNTY
Run
Creek
Turtle
CONRAIL
1 2 210 000 FEET
1 2 240 000 FEET
25 000 FEET
1 KILOMETER





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N
1 MILE
1 KILOMETER
Scale 1:20,000
(Joins sheet 10)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 19)
Stitzer Gap
Mountain
Stitzer
LAURELTON CENTER
Hickernell Spring
Laurel Run
Stony Run
Thorny Run
Spruce Run
HARTLEY
Hartleton
LEWISBURG
Swengel
Millmont
Laurelton
PENNS CREEK
Mud Run


WEST BUFFALO
BUFFALO
(Joins sheet 11)
MIFFLINBURG
BOUNDARY
TOWNSHIP
ROAD
Buffalo Creek
Run
Turkey
RIDGE
LIMESTONE
MOUNTAIN
SHAMOKIN
Swengel
White Springs
Dice
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 20)
N
1 MILE
1 KILOMETER
Scale 1:20,000

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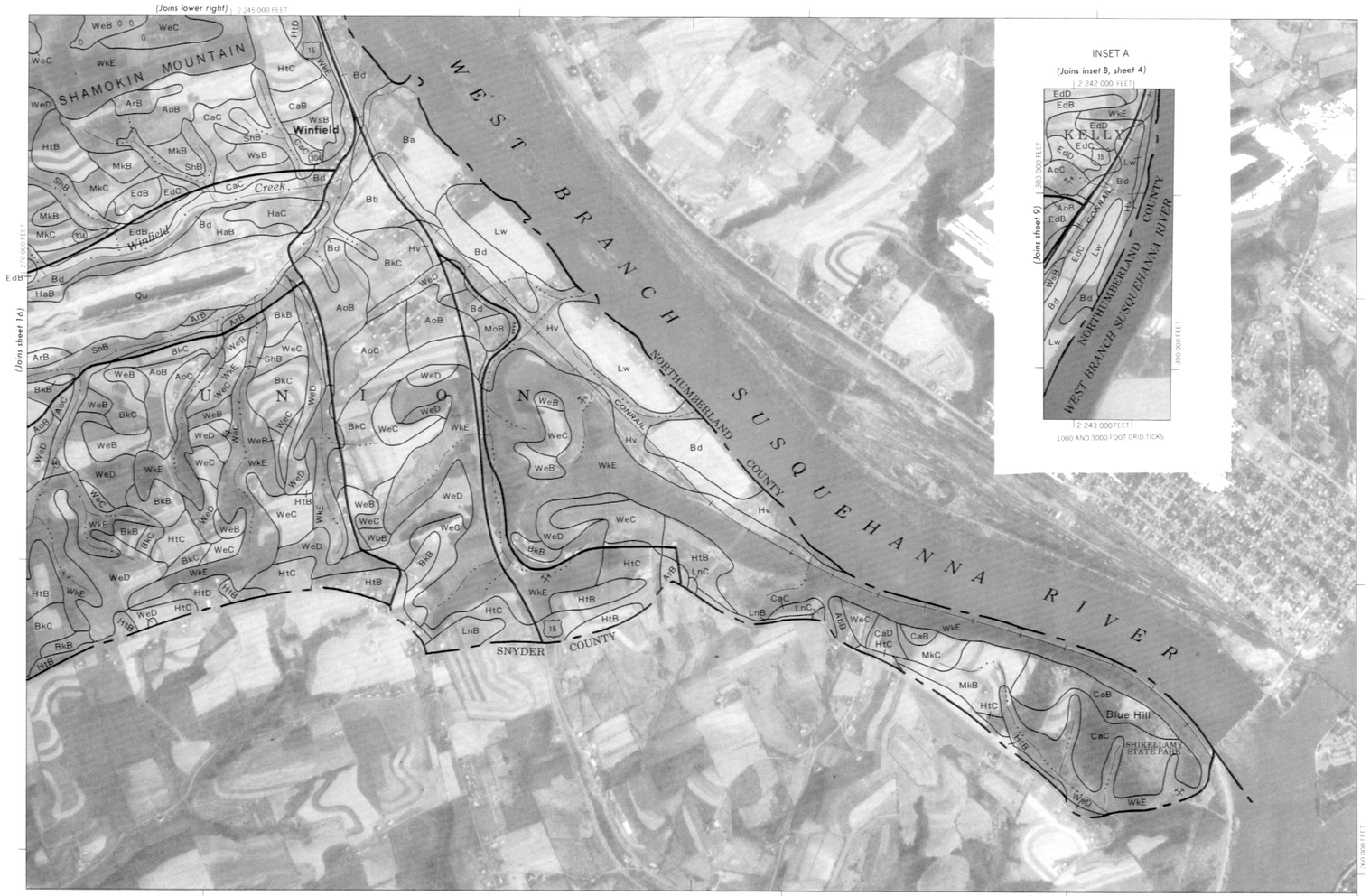


INSET A

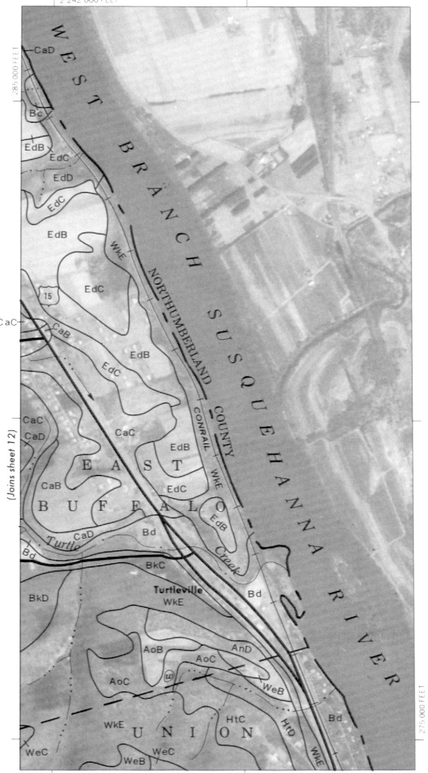
(Joins inset B, sheet 4)

2 242 000 FEET

1000 AND 3000 FOOT GRID TICKS

INSET B

2 242 000 FEET



3000 AND 5000 FOOT GRID TICKS

N

1 MILE
1 KILOMETER
0 0
1/4 0.5
1/2 1
3/4

Scale 1:20,000

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Topographic maps compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior Geological Survey from 1972 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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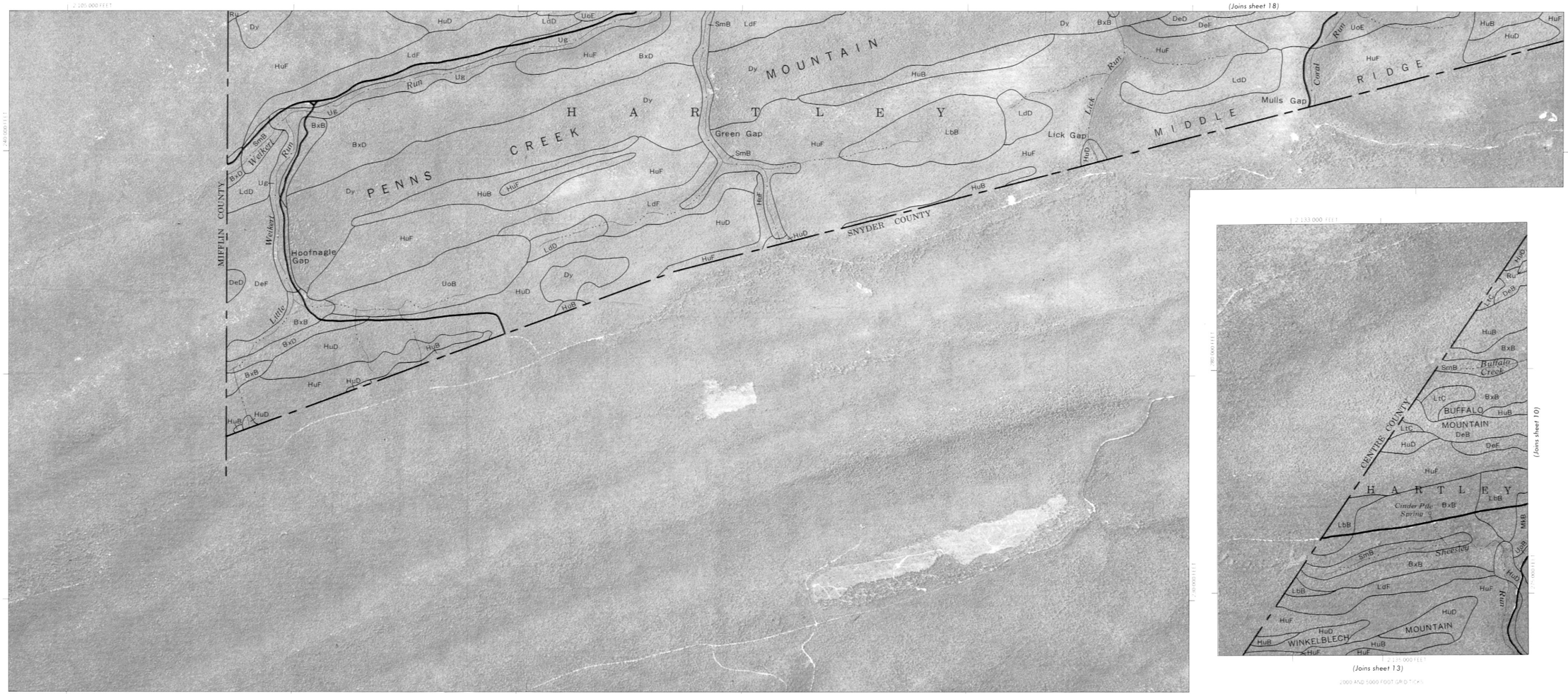

N

Scale 1:20,000

1 MILE
1 KILOMETER
0
0
1/4
0.5
1/2
1
3/4

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1973 aerial photographs. Coordinate grid ticks and land division corners, if shown, are approximately positioned.